



DOCUMENTING IMPROVED MOBILITY TECHNIQUES ON SIS AND TRIP FACILITIES

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16. Abstract The 2005 growth management legislation charged the Florida Department of Transportation (FDOT) with reviewing and providing concurrence on a variety of development types regarding their impacts on the state transportation system. Of particular concern are roads designated as part of the Strategic Intermodal System (SIS), the Florida Intrastate Highway System (FIHS), and facilities funded through the Transportation Regional Incentive Program (TRIP). This study was conducted to assist FDOT in carrying out this new legislative mandate. Specifically, the research objectives are: clarify the process(es) used in the evaluation of LOS regarding transportation site impact analysis for comprehensive plan amendments and developments of regional impact; identify methodology issues and clarify acceptable applications; and define "concurrence" and provide standard guidance regarding review and acceptance of mitigation strategies used to mitigate transportation impacts, particularly on SIS, FIHS, and TRIP facilities for use by FDOT staff and the development community. This report is comprised of two technical memorandums. Technical Memorandum I reviews applicable legislation, literature, research projects, and practices regarding FDOT procedures for level of service analysis within the site impact review process. Technical Memorandum I also identified issues gathered during a series of interviews held with FDOT and other reviewing agency staff. This initial stage of research resulted in the development of guiding principles including to champion effective mitigation strategies, to recognize valid mitigation proposals, to provide better certainty of outcomes, and to streamline administration. Technical Memorandum II includes tools, resources, and guidance to enable transportation partners to respond effectively to growth management issues, to become more proactive, and to maximize use of limited transportation funds. These transportation partners may include among others, local governments, metropolitan planning organizations (MPO), regional planning councils (RPC), and the Florida Departments of Transportation and Community Affairs (DCA). It also offers examples of what may be considered acceptable mitigation of transportation impacts to transportation facilities that are part of the SIS, FIHS, or are TRIP-funded and includes reference to many resource documents to further the users understanding.			
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EXECUTIVE SUMMARY

The 2005 growth management legislation charged the Florida Department of Transportation (FDOT) with reviewing and providing concurrence on a variety of development types regarding their impacts on the state transportation system. Of particular concern are roads designated as part of the Strategic Intermodal System (SIS), the Florida Intrastate Highway System (FIHS), and facilities funded through the Transportation Regional Incentive Program (TRIP). This study was conducted to assist FDOT in carrying out this new legislative mandate. Specifically, the research objectives are to:

- clarify the process(es) used in the evaluation of LOS, particularly on SIS, FIHS, and TRIP facilities, regarding transportation site impact analysis for comprehensive plan amendments and developments of regional impact;
- identify methodology issues and clarify acceptable applications; and
- define “concurrence” and provide standard guidance regarding review and acceptance of mitigation strategies used to mitigate transportation impacts, particularly on SIS, FIHS, and TRIP facilities for use by FDOT staff and the development community.

This report is comprised of two technical memorandums. Technical Memorandum I reviews applicable legislation, literature, research projects, and practices regarding FDOT procedures for level of service analysis within the site impact review process. The memorandum also identifies issues gathered during a series of interviews held with FDOT and other reviewing agency staff. The information provided the basis for recommendations to develop a clear process for site impact review, application of level of service tools, and procedures for concurrence with proposed mitigation strategies.

The literature review revealed extensive information on site impact and level of service analysis, as well as guidance on analyzing and addressing transportation concurrency alternatives (e.g. transportation concurrency exception areas, multimodal transportation districts), and the incorporation of multimodal solutions in development review and approval. This information was supplemented through interviews with District personnel as to current FDOT practices for site impact analysis, level of service analysis, and concurrence on SIS and TRIP mitigation. Those interviewed expressed a variety of concerns on these topics; however, the primary concern was what constitutes acceptable mitigation of adverse transportation impacts on SIS and TRIP facilities. Clear direction on FDOT policy and preferences relating to SIS/TRIP mitigation is needed both from a statewide perspective and from individual District perspectives given the variation of circumstances across the state.

When transportation impacts affect the SIS, the 2005 growth management legislation directs local governments to develop a plan to mitigate impacts to the SIS in cooperation with the Department, including, if appropriate, the development of a long-term concurrency management system.¹ It further requires the Department’s concurrence on proportionate fair-share mitigation. As with the DRI process, a key benefit of the concurrence requirement is that it affords FDOT the opportunity to “sit at the table.” This initial stage of research resulted in the development of guiding principles aimed at further clarifying how the Department might accomplish its new role. These principles included ideas on how to champion effective mitigation strategies, to recognize valid mitigation proposals, to provide better certainty of outcomes, and to streamline administration using the working concepts outlined as follows.

- Focus on building and maintaining relationships/partnerships.
- Provide data, tools, and other technical assistance to local governments and transit agencies.

¹ Section 163.3180(4)(f), (7), and (15)(a) Florida Statutes.

- Develop a “menu” of mitigation options.
- Work with local governments to develop and implement corridor plans.
- Apply alternative approaches to measuring impacts to the SIS.
- Include a definition of and specific requirements for transit-oriented development (TOD).
- Consider access and mobility issues on SIS Connectors in relation to the functions of related hubs.

The second half of this report contains Technical Memorandum II, which includes tools, resources, and guidance to enable transportation partners to respond effectively to growth management issues, to become more proactive, and to maximize use of limited transportation funds. These transportation partners may include, among others, local governments, metropolitan planning organizations (MPO), regional planning councils (RPC), and the Florida Department of Transportation (FDOT) and Department of Community Affairs (DCA). It also offers examples of what may be considered acceptable mitigation of transportation impacts to transportation facilities that are part of the SIS or FIHS, or are funded through the TRIP. This guidance includes reference to many resource documents to expand the users understanding.

Section I of Technical Memorandum II addresses growth management and site impact review processes. FDOT staff reviews a variety of transportation impact analyses addressing the impact of the proposed development, primarily on the State Highway System. Transportation impact analyses may address concurrency, comprehensive plan amendments, developments of regional impact (DRIs), or sub-DRI developments. In most cases, the transportation impact review process and methodology is driven by local governments, with little uniformity across the state or even at the District level. This section includes recommended practices to augment existing review processes for transportation concurrency, comprehensive plan amendments, developments of regional impact, DRI exemptions, sub-DRI development, and level of service variances.

Section II assists FDOT staff in carrying out their role in the review of the transportation impacts of proposed developments on the SIS, the FIHS, and TRIP-funded roadways. Florida statutes require FDOT to concur with mitigation plans for those impacts as proposed by local governments. This section defines “concurrency,” discusses opportunities to develop mitigation plans, and provides a “menu of options” regarding mitigation strategies for transportation impacts. Such strategies will require the collaboration of transportation partners during development and application.

Section III focuses on building and maintaining relationships among government agencies and other transportation partners which is essential to achieving mobility goals. The following approaches are mechanisms for coordination and collaboration:

- initiate and maintain contact with transportation partners;
- collaborate on multimodal strategies; and
- host (or co-host) an annual Multimodal Transportation Peer Exchange for the region. This regional event is a forum where peer-level representatives from FDOT, regional planning councils, MPOs, local governments, transit agencies, and developers can work toward creating a viable mobility plan for the region.

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LIST OF ACRONYMS

AADT annual average daily traffic	MMTD multimodal transportation district
ADA (DRI) application for development approval	MPO metropolitan planning organization
ADA Americans with Disabilities Act	MSV maximum service volume
BRT bus rapid transit	NCHRP National Cooperative Highway Research Program
CIE capital improvement element	NOPC notice of proposed changes (DRI)
CMP congestion management process	ORC Objections, Recommendations, and Comments Report (Comprehensive Plan)
CMS concurrency management system	PTO Public Transit Office
CORSIM traffic simulation model application	PUD planned unit development
CPA comprehensive plan amendment	QLOS quality/level of service
CRALLS constrained roadway at a lower level of service (Palm Beach County)	ROW right of way
CUTR Center for Urban Transportation Research	RPC regional planning council
DCA Department of Community Affairs	SAC suburban activity center
DO development order	SIS Strategic Intermodal System
DRI development of regional impact	TAZ traffic analysis zone
DU dwelling unit	TCEA transportation concurrency exception area
ECFRPC East Central Florida Regional Planning Council	TCMA transportation concurrency management area
EE external-external trips (through trips)	TCRP Transit Cooperative Research Program
FDOT Florida Department of Transportation	TDM transportation demand management
FHWA Federal Highway Administration	TDP transit development plan
FIHS Florida Intrastate Highway System	TIP transportation improvement program
FLUM future land use map	TND traditional neighborhood development
FSUTMS Florida Standard Urban Transportation Model Structure	TOD transit oriented development
ITE Institute of Transportation Engineers	TRIP Transportation Regional Incentive Program
ITS intelligent transportation systems	UGMFP Urban Growth Management Functional Plan (Portland, Oregon)
LGCP local government comprehensive plan	VMT vehicle miles traveled
LOS level of service	VTR vehicle trip rate
LRTP long range transportation plan	WSDOT Washington State Department of Transportation
M&M modeling and monitoring (DRI)	

PART I – TECHNICAL MEMORANDUM 1

INTRODUCTION

This technical memorandum is the first phase of a study for the Florida Department of Transportation on the process used by Districts and other review agencies for evaluating level of service (LOS) on the Strategic Intermodal System (SIS), the Florida Intrastate Highway System (FIHS), and facilities funded through the Transportation Regional Incentive Program (TRIP). The study also addresses the process for reaching concurrence with the applicant and other agencies on required mitigation of transportation impacts. Specifically, the project involves the following research objectives:

- Clarify the process(es) used in the evaluation of LOS, particularly on SIS, FIHS, and TRIP facilities, regarding transportation site impact analysis for comprehensive plan amendments and developments of regional impact;
- Identify methodology issues and clarify acceptable applications; and
- Define “concurrence” and provide standard guidance regarding review and acceptance of mitigation strategies used to mitigate transportation impacts, particularly on SIS, FIHS, and TRIP facilities for use by FDOT staff and the development community.

This memorandum reviews applicable legislation, literature, research projects, and practices regarding FDOT procedures for level of service analysis within the site impact review process. The memo also identifies issues gathered during a series of interviews held with FDOT and other reviewing agency staff. The information summarized here provides the basis for recommendations to develop of a clear process for site impact review, application of level of service tools, and procedures for concurring with proposed mitigation strategies.

LEGISLATIVE REQUIREMENTS

The review and analysis of development impacts to the State Highway System is required by a number of Florida Statutes (F.S.) and Administrative Codes. Key requirements are found in both Chapters 163 and 380, Florida Statutes, which include provisions from the 2005 Growth Management legislation (SB 360).

Comprehensive Plan Amendments

Chapter 163 establishes the requirements for local government comprehensive plans. Rule 9J-11.006 Florida Administrative Code (F.A.C.), sets forth submittal requirements for comprehensive plan amendments in Florida and establishes responsibilities of reviewing agencies, including the Florida Department of Community Affairs (DCA), adjacent local governments, metropolitan planning organizations, regional planning councils, and the Florida Department of Transportation (FDOT). Submittal requirements include data and analysis regarding the proposed amendment’s “availability of and demand on” traffic circulation among other things. However, limited guidance is provided on the data and analysis methodology required to demonstrate compliance. Rule 9J-5.002(2), F.A.C. states that DCA will determine whether the data were collected and applied in a professionally acceptable manner and specifically requires local governments to demonstrate “the scale of public services the local government provides or is projected to provide as it relates to the level of capital improvements planning required.”

Developments of Regional Impact (DRIs)

Developments of regional impact, addressed in §380.06, F.S. are defined as “...any development which, because of its character, magnitude, or location, would have a substantial effect on the health, safety, or welfare of citizens of more than one county.” (§380.06(1), F.S.) Statewide guidelines and standards, in addition to the statutes, are found in Rule 28-24, F.A.C.

The applicable regional planning council (RPC) is charged with coordinating the review process that involves the local government with land use jurisdiction and affected state, regional, and local agencies. RPCs are the designated coordinating agencies for the DRI review process due to their very nature as a regional body. Rule 29, F.A.C. outlines general RPC practices and procedures for the DRI review process; however, some RPCs have adopted additional administrative procedures that have also been included in the F.A.C. Among other things, procedures address the process of DRI review and monitoring, fees, number of copies to be submitted, alternative procedures for areawide DRIs and Florida Quality Developments and procedures for the pre-application conference.

The Florida Department of Community Affairs “reviews DRIs for compliance with state law and to identify the regional and state impacts of large-scale developments. The Department makes recommendations to local governments for approving, suggesting mitigation conditions, or not approving proposed developments.”² Rule 9J-2.045, F.A.C. establishes how DCA is to evaluate “transportation facility issues in the review of applications for binding letters, local government development orders, and DRI applications for development approval (ADA).” The DCA website contains information for both applicants and local government regarding developments of regional impact including DRI thresholds, procedures, DRI status, and forms.

Transportation impacts of a proposed development of regional impact are identified through the DRI review process. The “Application for Development Approval (ADA), Form RPM-BSP-ADA-1” must be completed by the applicant for review. This form contains 38 questions, each of which concerns a specific topic regarding impacts of the proposed development. Question 21 is a nine-part procedure (A through I) for estimating transportation impacts. Parts A through F constitute a basic traffic impact methodology and parts G through I address site access, protection of transportation corridors, and transit service, bicycling, and walking. Applicants respond to this question through a transportation impact analysis, typically performed by a consultant on behalf of the developer, prepared in accordance with the procedures outlined in the FDOT Site Impact Handbook (1997). DCA relies on FDOT to review the technical aspects of the applicant’s response to Question 21.

The DRI-related transportation impact requirements apply only to transportation facilities of state or regional significance. According to Rule 9J-2.045, F.A.C., roadways considered to be state or regionally significant must be paved and have one or more of the following characteristics:

- cross local government jurisdictional boundaries;
- be a component of the state highway system (including SIS and/or FIHS);
- connect components of the state highway system;
- provide access to a regional center; or
- be a hurricane evacuation route.

In addition, a state or regionally significant roadway segment is considered “significantly impacted by the proposed development if, at a minimum, the traffic projected to be generated at the end of any stage or phase of the proposed development, cumulatively with previous stages or phases, will utilize

² <http://www.dca.state.fl.us/fdcp/dcp/DRIFQD/index.cfm>

INTRODUCTION

five percent or more of the adopted peak hour level of service maximum service volume of the roadway, pursuant to (5) above, and the roadway is projected to be operating below the adopted level of service standard at buildout of that stage or phase” (Rule 9J-2.045(6)). If a transportation facility significant impact threshold of less than five percent is specifically adopted by a local government comprehensive plan, then this lower significant impact threshold is used to establish the impact area.

The FDOT review must include a comparison of the transportation impact analysis presented in the ADA with adopted LOS standards in the local government’s concurrency management system (CMS) assuming that the standards are in compliance with Rule 14-94, F.A.C. For urbanized areas, FDOT must also review proposed provisions to reduce single-occupant vehicle travel.

Rule 9J-2.045(7)(d) states, “Where the transportation impacts of the development are determined to occur in more than one local government jurisdiction, the development order shall ensure that any significant multi-jurisdictional facility impacts are mitigated pursuant to the requirements of Section 380.06, F.S., and the applicable level of service standards of the jurisdiction in which the impacts occur.” Mitigation is required at each stage or phase of a project where the transportation impact analysis shows that the project’s impacts reduce a roadway’s level of service below the applicable adopted LOS standard. Mitigation strategies can either improve the capacity of a facility or reduce the number of automobile trips generated by the proposed DRI.

In many cases, significant transportation impacts are mitigated through phasing and pipelining. Phasing is a strategy where additional analysis and/or other mitigation strategies are tied to the phases in which a development is built. In phasing, a developer may be required to seek approval for subsequent phases after the initial phase has been approved. Pipelining is the practice whereby an improvement is identified as being significant to the transportation system and, rather than making several smaller improvements, funds are “pipelined” or targeted by the agency toward the more significant improvement. This practice is permitted in accordance with Section 163.3180(12)(c), F.S. and Rule 9J-045(7)(a)(3)(d)(III).

According to Section 163.3180(12), F.S., “. . . a multiuse development of regional impact may satisfy the transportation concurrency requirements of the local comprehensive plan, the local government’s concurrency requirements of the local comprehensive plan, the local government’s concurrency management system and Section 380.06, F.S., by payment of a proportionate-share contribution for local and regionally significant traffic impacts . . .” if, among other things, the developer guarantees payment of the proportionate share contribution. Under this subsection the proportionate fair-share contribution is calculated based on the “. . .cumulative number of trips from the proposed development expected to reach the roadways during the peak hour from the complete build-out of a stage or phase being approved, divided by the change in the peak hour maximum service volume of roadways resulting from construction of an improvement necessary to maintain the adopted level of service, multiplied by the construction cost, at the time of the developer payment, of the improvement necessary to maintain the adopted level of service.” (Section 163.3180(12) (e), F.S.). Proportionate-share mitigation can include private funds, contributions of land, construction, and facilities. Proportionate-share payments may apply to transit improvements if the improvement is a transit alternative to automobile travel.

The 2005 growth management legislation included provisions that exempt certain developments that meet DRI threshold from undergoing the DRI review process. Prior to adoption of the 2005 growth management legislation, DRI thresholds could be increased 50 to 150 percent for developments in urban central business districts, regional activity centers, and rural areas of critical economic concern, thus making a DRI review less likely. The 2005 growth management legislation included provisions allowing outright exemptions for developments that would otherwise meet DRI thresholds in

designated urban service boundary areas, rural land stewardship areas, or urban infill and redevelopment areas as outlined in §380.06(24), F.S. The legislation provides parameters for these exemptions by requiring that local governments establish agreements with FDOT and adjacent local governments to address the transportation impacts of the proposed development on state and regional transportation facilities and adopt proportionate fair-share mitigation strategies.

Level of Service Standards

Impacts to the state transportation system are analyzed in terms of the maximum service volume (MSV) or capacity of each facility in accordance with the adopted level of service (LOS) standard. Rule 14-94, F.A.C. establishes LOS standards for facilities on the SIS and FIHS as well as those funded through the TRIP. MSVs for roadways are established in the Florida Department of Transportation's (FDOT) 2002 Quality/LOS Handbook's (Handbook) Generalized Level of Service Tables (FDOT Generalized LOS Tables). Local governments also use these tables to establish the MSV for other state and local roads.

Rule 14-94, F.A.C. also requires that LOS calculations and evaluations "be based on the methodology contained in Transportation Research Board's Highway Capacity Manual 2000, the Department's 2002 Quality/Level of Service Handbook, or a methodology determined by the Department to be of comparable reliability." The most current software tool for performing more detailed LOS evaluations is LOSPLAN. Although parameters exist to guide the application of the software, its use and misuse demonstrate that clearer guidance on the parameters governing its use need to be made more explicit.

The 2005 growth management legislation charged FDOT to review and provide concurrence on a variety of development types regarding their impacts to the state transportation system. Of particular concern are roads designated as part of the SIS, the FIHS, and facilities funded through the TRIP. Types of developments reviewed for their impacts include DRIs, comprehensive plan amendments, and other large-scale developments that may impact the state transportation system.

The 2005 growth management legislation modified certain requirements for comprehensive plan amendments. For example, tighter requirements were adopted for comprehensive plan amendments that designate transportation concurrency exception areas (TCEAs). Plan amendments designating TCEAs must now be accompanied by data and analysis justifying the size of the exception area. Local governments must also adopt and implement strategies to support and fund mobility within the TCEA, including alternative modes of transportation, and demonstrate how they will provide mobility, including improved network connectivity and the use of certain urban design strategies for achieving a land use mix at appropriate densities. Revenue sources to fund these mobility strategies must also be identified and short-term improvements must be adopted into the capital improvement schedule of the financially feasible capital improvement element.

LITERATURE REVIEW

Literature and Research in Progress

A number of documents pertinent to this research were identified by the Project Team. Appendix A contains a brief summary of the following documents:

- *2002 Quality/Level of Service Handbook*, Florida Department of Transportation, 2002;
- Growth Management Issue Papers - DRAFT, Florida Department of Transportation, January 2007;
- *Highway Capacity Manual 2000*, Transportation Research Board 2000;
- *Impact Fee Credits for Livable Communities Improvements*, Center for Urban Transportation Research, University of South Florida, 2005;
- *Incorporating TDM into the Land Development Process*, Center for Urban Transportation Research, University of South Florida, 2005;
- *Land Developer Participation in Providing for Bus Transit Facilities/Operations*, Center for Urban Transportation Research, University of South Florida, 2002;
- *Model Ordinance for Proportionate Fair-Share Mitigation of Development Impacts on Transportation Corridors*, Center for Urban Transportation Research, University of South Florida, 2006;
- *Model Regulations and Plan Amendments for Multimodal Transportation Districts*, Center for Urban Transportation Research, University of South Florida, 2004;
- *Multimodal Transportation Districts and Areawide Quality of Service Handbook*, Florida Department of Transportation, 2004;
- *NCHRP Project 03-70: Multimodal Level of Service Analysis for Urban Streets [In Progress]*, Transportation Research Board, completion date: June 2007;
- *Options for Making Concurrency More Multimodal: Response to SHB 1565 (2005 Session)*, Mark E. Hallenbeck, Dan Carlson, Keith Ganey, Anne Vernez Moudon, Luc de Montigny, and Ruth Steiner, December 2006;
- *Practitioner's Handbook. From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making*, TCRP Report 106/NCHRP Report 536, 2005;
- *Site Impact Handbook*, Florida Department of Transportation, April 1997;
- *Trip Generation, Internal Capture and Pass By Software (TIPS). Version 1.3.6*, Florida Department of Transportation (Systems Planning Office);
- *Working with Transportation Concurrency Exception Areas (TCEA)*, Florida Department of Transportation, September 2006;
- *Working with Proportionate Fair-Share*, Florida Department of Transportation, December 2006;
- *Working with Transportation Concurrency Management Systems (CMS)*, Florida Department of Transportation, September 2006.

In addition, several other research projects related to this research are in various stages of completion. These projects are summarized below.

▪ **Guidelines and Performance Measures to Incorporate Transit and Other Multimodal Strategies into the Development of Regional Impact Review Process**

(This project was previously entitled, “Performance Measures and Best Practices for Incorporating Transit in the FDOT DRI Review Process”) – (CUTR) The FDOT Public Transit Office and District 5 have asked CUTR to identify and define guidelines to incorporate transit (and other multimodal strategies) into the FDOT DRI review process including FDOT staff involvement in the review process, criteria for review, coordinating with other agencies, data collection, training requirements; and other related issues. It is anticipated that the guidelines generated through this research project will extremely valuable to the current project.

▪ **A Guide for the Creation and Evaluation of Transportation Concurrency Exception Areas (TCEAs)**, Department of Urban and Regional Planning, University of Florida, February 2007.

This document provides guidance that can be used to aid local governments in implementing or refining the implementation of transportation concurrency exception areas (TCEAs). These guides are based on assessments made of various TCEAs within Miami-Dade County, Collier County, and Daytona Beach using proposed evaluation criteria. By providing guidance on how to improve future applications of TCEAs, this report contributes to practices available to improve mobility on SIS and TRIP facilities.

A copy of the TCEA evaluation criteria can be found in the appendix of the guide. The criteria were developed for each element required of TCEAs in accordance with recent changes to the 2005 Growth Management Act. The criteria are separated into two parts: a basic statutory TCEA designation requirements and recommended strategies and evaluation criteria. The latter part is further divided into ten sections, with criteria and performance measures gauging a TCEA’s ability to:

- Support mobility;
- Fund mobility;
- Implement strategies that support the purpose of the designation;
- Include alternative modes of transportation;
- Demonstrate how mobility will be provided;
- Address urban design;
- Address appropriate land use mixes;
- Address intensity and density;
- Address network connectivity; and
- Plan to mitigate effects on the SIS.

The guide presents seven summaries of lessons learned from evaluating TCEAs currently established in the case-study locations against the criteria.

1. *Linking Transportation Policy and Urban Design*: The report found that there is often poor linkage between the two, despite language in the 2005 Growth Management Acts connecting them.
2. *The Case for Regional Coordination*: Regional coordination helps protect the SIS and promote regional mobility.

3. *Traditional Downtowns vs. Special Purpose Activity Centers*: Unlike traditional downtowns, the special purpose activity centers reflect tourist-oriented areas, such as those found in Daytona Beach. The Daytona Beach TCEA is based on the economic development aspects of this particular area.
4. *The TCEA in Suburban Context*: TCEAs are typically applied to urban settings. Suburban areas should be required to meet certain development and funding prerequisites prior to being granted TCEA status.
5. *Funding Mobility*: TCEAs are mandated to support and fund mobility. However, based on two of the case studies, the funding elements of the TCEAs did not show an ability to enhance mobility and reduce vehicle trips. It is therefore recommended that local governments be able to justify “financial feasibility” to warrant designation as a TCEA.
6. *Performance Measures and Monitoring*: There was a general dearth of reported performance measures from the case study TCEAs. Two case study locations have data that can be translated into performance measurements, while one location had no urban design or mobility standards that could be readily translated into such measurements.

▪ **Analysis of Corridor Management Practices on Selected Critical SIS Facilities**

The Center for Urban Transportation Research (CUTR) was retained by FDOT to investigate corridor management practices and state and local coordination efforts in corridor management on critical SIS facilities in Florida. Researchers documented the corridor management practices of local governments along selected corridors and determined formal and informal coordination efforts between the local governments and FDOT. A final report synthesized current and best practices and recommended strategies for improving corridor management on the selected corridor. As part of the study, CUTR conducted a workshop for local government staff and policy makers on corridor management best practices and land development regulations that support access management. The project will also culminate in a work plan providing guidance to Districts or their consultants so they may conduct similar corridor access management studies.

▪ **Development of Transit Facility Standards & Guidelines for FDOT Districts 1 & 7**

The Transit Facility Guidelines Handbook, funded by District 1 and 7 Transit Offices, is intended to establish standards and/or guidelines for design, access, and safety of transit facilities for use by FDOT, other public agencies, and consultants throughout Districts 1 and 7. The final deliverable of this project will be a Transit Facility Standards and Guidelines Handbook that can be distributed to public agencies, developers, and citizens throughout the region. The goal of the handbook is to provide technical and comprehensive guidance on the design of transit facilities and roadways that accommodate transit and transit related activities. In addition, the design standards in the handbook will be structured so that they can be easily incorporated into local land development regulations and the development review process. The guidebook itself is being undertaken by Gannett Fleming and Tindale-Oliver Associates with assistance from CUTR.

▪ **Transit-Oriented Development/Comprehensive Plan Training**

FDOT’s Public Transit Office (PTO) prepared and delivered this pilot classroom-style training to educate comprehensive plan reviewers (including DCA personnel and others) on how to recognize effective transit-oriented developments (TODs) in the context of local government comprehensive plans. PTO, along with a consultant, researched and developed the comprehensive plan TOD training course; prepared, delivered, and solicited feedback on the training and draft training material from the target audience; made appropriate modifications; and developed guidance for delivery of the training

material. Discussion with course participants also assisted in determining primary criteria for codifying standards of TOD. Major themes of the training include the three Ds of TODs (density, diversity, and design), the importance of identifying TODs as special incentive districts on the FLUM, and identification of primary TOD characteristics.

▪ **Transportation Concurrency and Impact Assessment Study**

This DCA project, still underway, requested support from CUTR with providing technical assistance to local governments on executing relevant transportation concurrency and related provisions of the 2005 growth management legislation. These changes include TCEAs, de minimis transportation impacts, compatibility of level of service standards and coordination of methodologies, proportionate share for multiple-use DRIs, and transportation proportionate fair-share. Also noteworthy are the requirements for evaluation and appraisal of local comprehensive plans and common methodologies for concurrency management systems. Another topic requiring guidance is related to statutory exemptions from DRI requirements under certain conditions. The draft report investigates concurrency management best practices and includes suggested transportation impact methodologies, agreements and procedures to address the transportation concurrency and growth management issues noted above.

▪ **Utilizing Proportionate Share Mitigation Options to Expand Transit and Multimodal Capacity for Effective Growth Management Planning (suggested working title)**

This project (currently in the scoping phase with Kittelson & Associates, Inc.), sponsored by FDOT's PTO, will develop material to address items of consideration when using transit capacity improvement as a mitigative effort to meet concurrency. The PTO will review comprehensive and long range transportation plans and proportionate fair-share ordinances as they relate to transit in order to identify where proportionate fair share can be used. Based on the review, best practices will be developed. The PTO will also identify information needed to address transit proportionate fair share; devise methods to determine transit proportionate fair share; investigate areas for future study that address transit as it matures in an area; and conduct workshops and public outreach on the developed methodologies. Major themes include providing overview and guidance in applying transit proportionate fair share and identifying intended versus actual results of transit considerations.

CURRENT PRACTICE

A number of individuals and groups, including FDOT LOS Task Team members and representatives from agencies having experience and expertise in level of service analysis and/or concurrency management systems, were interviewed (in person, via telephone, or via email) for this research. The interviews aimed to seek out issues and practices in the review of transportation site impact assessments and level of service analysis for concurrency, comprehensive plan amendments, and DRIs, especially with regard to impacts to the SIS and facilities funded through the TRIP.

An interview guide was developed to guide the conversation (see Appendix B). Issues addressed included use of FDOT Generalized Tables, base year MSVs, and future year traffic projections; the DRI review process, comprehensive plan amendment review process, and concurrency review process; and use of proportionate fair-share mitigation (for roadways). Those interviewed represented FDOT, RPCs, MPOs, local government planning and development services; large transit agencies; and consultants. The results of the interviews are categorized below as general review procedures, comprehensive plan amendments, DRIs, and sub-DRIs along with issues identified.

General Review Procedures and Issues

FDOT staff review a variety of transportation or traffic impact analyses addressing the impact of the proposed development, primarily on the State Highway System. The nature of the review process for transportation impacts leaves the FDOT staff in the position of reviewing whatever transportation impact analysis is submitted by the applicant. Transportation impact analyses may address concurrency, comprehensive plan amendments, DRIs, or sub-DRI developments and with the exception of DRIs, are often guided by local government requirements. Currently, there is no common methodology to guide applicants in preparing such analyses; however, CUTR, under contract with Florida DCA, has drafted a series of reports addressing concurrency management best practices, including suggested transportation impact methodologies. These reports are currently being synthesized into a single, unified report to be published later in 2007.

Each District reported reliance on the methods found in the Site Impact Handbook and the 2002 Quality/Level of Service Handbook (Q/LOS Handbook) for reviewing transportation impact analyses. The Site Impact Handbook “was prepared (1) to address **mandatory** analysis and review requirements, (2) to offer guidance to all agencies on **when** the Department will be conducting these reviews, and (3) to identify **how** these reviews will be conducted, including which special practices (i.e., instructions) are applicable for each type of analysis or review.”³ Included are detailed procedures, checklists, and criteria for evaluating the potential impacts of comprehensive plan amendments, DRIs, and any developments that request access to state highways. It also includes thresholds for more detailed analyses, criteria for analysis years, assumptions for trip generation/distribution/assignment, and methods for defining the study area.

Level of Service

All Districts annually estimate the level of service for each of their state roads and use this information as a guide during the review process. Generally, a review begins with a sketch planning analysis performed using the FDOT Generalized Tables to screen for deficiencies. Similarly, consultants reported making a preliminary determination for PM peak hour, peak direction volumes using the

³ FDOT Site Impact Handbook, 1997, page 1.

FDOT Generalized Tables or locally adopted services volumes from the applicable local government concurrency management system.

Few Districts indicated a point at which a more detailed analysis would be required other than when a facility was at or near the minimum acceptable LOS standard. In one case, however, FDOT staff reported requiring a more detailed analysis on facilities where anticipated traffic volumes (background plus development traffic) exceed 85% of the maximum service volume for the minimum acceptable LOS standard as established in the Generalized Tables.

When a more detailed analysis is required, the LOSPLAN software is the FDOT accepted method for the analysis using actual field data such as signal timings, turning movements, lane utilizations, vehicle composition and route geometrics. Notably, most transportation impact analyses address the level of service for roadways only, rather than a combination of quality/level of service analysis for all modes. Only one District reported that it is beginning to use the quality/level of service analysis for all modes.

Most local governments and the FDOT require that regional models be used to determine trip distribution. A consultant that regularly prepares traffic impact studies noted that application of the regional demand model is time-consuming and becoming more so with increased complexity due to FDOT refinements (e.g., conversion to district-wide models, lifestyles gen/distrib, multi-modal issues in network coding). It was also noted that there is a need to validate models for smaller sub-areas.

Several issues regarding level of service standards and maximum service volumes were identified during the interviews:

1. It is difficult to achieve and/or maintain rural LOS standards on facilities which run between two urbanized areas. This is due to the high level of activity between two urban areas connected by the facility.
2. It is difficult to treat SIS connectors the same as SIS facilities because LOS is difficult to determine on such short segments, and because each connector has its own singular characteristics/functions. For example, a Q/LOS analysis including transit, bicycle, and pedestrian facilities may help to identify needs on one connector, while different measures may be appropriate for airports and seaports.
3. Because of the higher LOS standards established for SIS facilities, DRIs that were approved long ago (e.g., 20 years ago) along failing or soon-to-be failing SIS facilities will face additional obstacles should they seek a Notice of Proposed Change or a Substantial Deviation. As a result, some Districts are now seeing efforts from the development community to seek a variance on the LOS standard on the SIS facilities.

One of the major problems encountered in District 4 is that all roads that connect to Tri-Rail stations are SIS connectors and many do not meet LOS standards. The District is developing TOD guidelines for its FEC passenger rail study, but also for development around the Tri-Rail stations where opportunities exist. However, overcapacity connectors inhibit denser TOD-type development. For example, District 4 is working with Broward County to address mobility on I-95, a SIS facility, and Broward Blvd, a SIS connector, both which are over capacity. They are trying to be more flexible with finding solutions to connector LOS issues. District 4 conducted a study of SIS connectors and identified what improvements would bring them to baseline LOS compliance. Now, in dealing with connectors, the District is looking at using a mix of roadway improvements (similar to a congestion management system project list) combined with selection from a "grab-bag" of tools - primarily bike/ped/transit - which can be

customized to address and offset congestion on the affected connectors. The District has established a working group including Broward County planning to determine viable/approvable offsets for alternative transportation measures.

4. Many local governments maintain specific capacities or maximum service volumes for facilities based on ARTPLAN. This is due, in part, to the fact that local governments believe the FDOT Generalized Tables are inadequate for level of service analysis and that, according to the Tables, existing traffic volumes already consume the MSV of many facilities. A consultant noted that determining LOS based upon arterial travel speeds is difficult to manage when development review is based on capacity availability.

Local governments have become much more interested in state road LOS due to SB 360 (requirement of financial feasibility). Many are seeking funding and technical assistance from the state to help with addressing these deficiencies.

5. There is a lack of correlation between intersection LOS and roadway concurrency.

Software

All Districts cited the use of level of service analysis software, including parameters, in accordance with the Q/LOS Handbook. No District offered specific parameters for other allowed software. Some Districts have allowed the use of SYNCHRO for signal timing optimization for the various types of reviews including comprehensive plan amendments; on the other hand, some Districts do not allow the use of other programs due to the level of effort required to become proficient in using them. Several of those interviewed also mentioned that SYNCHRO is only allowed where a commitment exists by the local government to revise signal timing accordingly. One consultant reported that “Synchro is our preferred tool for replicating existing traffic conditions for intersection LOS. Synchro results can be exported to HCS for intersection LOS reports and compiled for HCS Arterial LOS evaluation.” It was also noted “if simulation results are to be provided, at least 3 simulation periods using a different ‘seeded’ network must be run and then averaged.”

In some Districts where the use of other software is allowed, consultants are needed to review the results. District 4 has allowed the use of TSIS/CORSIM for interchange proposals – a method often requested by the Federal Highway Administration (FHWA) to ensure that ramp queuing traffic is not backing up onto the mainline. The following issues were noted by District 5.

1. Q/LOS software – Regarding the K_{100} factor (ratio of the traffic volume in the study hour to the average daily traffic): a minimum of .09 is too high, especially in a dense urban area where it is often .07. The difference is an observed K versus a demand K. Therefore, it may be necessary to resolve these differences in dense urban areas.
2. District staff are seeking direction as to what software tools are acceptable and appropriate in certain situations. For example, the use of SYNCHRO has been controversial and nearly always requires a consultant’s review. Staff has had limited training with the software and some have no copy of SYNCHRO available in their department for use.

Comprehensive Plan Amendments (CPAs)

Each District regularly reviews CPAs, again using the Site Impact Handbook and the Q/LOS Handbook as guidelines. The CPA information and transportation analysis based on the proposed change in land use are provided by the applicant with guidance from the local government having jurisdiction. However, the guidance provided is limited and rarely requires an assessment of the cumulative impacts of a series of concurrent land use plan amendments on the transportation system.

In many Districts, level of service for each facility is reviewed using only the FDOT Generalized Tables for both short-term and long-term amendments. One District allows the use of LOSPLAN with documentation of signal timings from local governments in certain cases. Upon completion of the review, FDOT provides a written statement for inclusion in the preparation of DCA's Objections, Recommendations and Comments (ORC) Report.

A range of issues regarding the review of comprehensive plan amendments surfaced during the interview process:

1. Whether or not it is appropriate to use an LOSPLAN analysis to determine level of service on a facility for 10, 20, or 30 years in the future.
2. Willingness of local governments to allow comprehensive plan amendments without addressing transportation impacts because they believe those impacts will be dealt with at the concurrency stage.
3. Disconnect between MPO long range plans and local government comprehensive plans. For example, one plan will show 4 lanes on a facility while the other shows 6 lanes on the same facility.
4. Inability to "Just say NO" to comprehensive plan amendments that adversely impact the transportation system. Many District representatives end up making "strong recommendations" to DCA because they do not have the authority to deny proposed amendments.
5. Charge to protect mobility on the SIS leads to objections to comprehensive plan amendments with otherwise sound planning objectives, because some vehicle trips impact an overcapacity SIS facility.
6. Although proportionate fair-share mitigation is to be applied only in the context of concurrency review, it is unclear to FDOT Districts whether proportionate fair-share mitigation is also applicable to comprehensive plan amendments. This is because of the fine line that often occurs between comprehensive plan amendments and related development proposals.

District 4 commented on the Palm Beach County "pre-comp plan submittal" held twice per year for the CPA cycle. This process allows all participating agencies to provide early input to applicants resulting in a more manageable process for all involved.

Developments of Regional Impact

DRIs are subject to a review process that is spelled out in detail in both Florida Statutes and Administrative Code. All reviews are conducted by the FDOT in accordance with the FDOT's Site Impact Handbook (1997). FDOT's role in the DRI review process includes:

- participation in the DRI traffic impact methodology meeting between the applicant and reviewing agencies;
- review of applications for development approval (ADA) and notices of proposed changes (NOPC) along with concurrent proposed amendments to the local government comprehensive plan (LGCP); and
- provision of comments and recommendations to the RPC.

Because it is a more structured process, it is easier for most Districts to achieve results through the review process. FDOT may require a developer to provide specific transportation system improvements or require payment of a proportionate share of the development's impacts. All Districts

actively participate in traffic impact methodology meetings where guidelines for LOS analysis are established. Review of traffic impacts is only performed on state roads unless the local government has specifically requested FDOT assistance for reviewing non-state roads. FDOT staff often don't know if their recommendations are considered or followed-up on.

The East Central Florida Regional Planning Council (ECFRPC) and District 5 employ the Monitoring and Modeling (M&M) Process which requires a traffic study before each phase of the DRI to determine if additional mitigation is required.⁴ This is in contrast to many other areas that base mitigation for the entire DRI on the traffic analysis prepared for the initial DRI evaluation.

Presumably, the structured nature of this M&M review process results in fewer issues being brought up during the interview process, including:

1. The Phase 1 traffic impact analysis of a DRI rarely shows impact on transportation system because the additional traffic volume generated by this Phase doesn't meet the 5% significance test. As a result, traffic impacts and, if necessary, mitigation is determined using less accurate data due to the development occurring further in the future.
2. It is unclear as to how to compensate a developer for building a road that creates excess capacity to mitigate transportation impacts.

Sub-DRI Development and Concurrency

Districts varied on whether reviews were performed for developments smaller than DRIs, or sub-DRI developments or concurrency. In most cases, FDOT only becomes involved in reviewing the transportation impacts of sub-DRI development if assistance is requested by DCA, the local government, or if an access permit is needed and FDOT staff determines that the traffic impacts warrant a more detailed analysis.

1. Developments that are smaller than DRIs often impact SIS and TRIP facilities. There is no systematic way to ensure that FDOT has the opportunity to review and ensure mitigation of the transportation impacts of sub-DRI development to SIS and TRIP facilities.

Sub-threshold DRIs, in some instances, are larger than DRIs. For example, Rule 9J-28 allows regional activity centers (RAC), which may be 2.5 times larger than DRIs but are exempt from the DRI review process. Another example involves a development that may be smaller than a DRI by only one unit. Despite the level of impact such developments may have on the State Highway System (SHS) including SIS and TRIP facilities, FDOT only reviews them when they require an access permit or if DCA requests assistance. In addition, it is unclear whether they are required to comply with local proportionate fair-share mitigation requirements.

2. In cases where a traffic impact study is provided for an access permit from FDOT, it is very difficult to obtain additional funds from the developer for capacity improvements if the local government has already issued development approval.
3. In cases where local governments do collect contributions for mitigation of transportation facilities, the money is not spent on state roads unless the contribution is a condition of the DRI review process.
4. FDOT staff has limited understanding of and/or involvement with local government concurrency management systems.

⁴ East Central Florida Regional Planning Council, "Guidelines and Questions for Transportation Monitoring and Modeling Studies." September 2000.

Existing Traffic Volumes

Most Districts require the use of the most recent FDOT counts or estimates that are available. Some Districts do not allow the use of traffic volumes more than one year old, particularly if significant development has been occurring in the area. If FDOT counts are not available or counts must be taken for other reasons, counts must be taken in accordance with the guidance provided in the "Manual on Uniform Traffic Studies."⁵ Basically, 72-hour counts may be taken mid-week (Tuesday, Wednesday, or Thursday) and then adjusted using the appropriate FDOT factors to determine average annual daily traffic (AADT). Turning movement counts are generally allowed only to establish the turning percentage, which is then applied to AADT to determine peak hour volumes, representing the 100th highest hour of traffic.

Future Traffic Volume Forecasting

Most Districts accept historic trends and/or model projections for traffic forecasting and review future traffic for reasonableness using a combination of these methods. Vested or approved trips documented in local government concurrency management systems are added to the projected future traffic. One interviewee noted that "approved trips for intersection movements are less commonly tracked for inclusion in the background traffic." Future traffic volumes provided in the transportation impact analysis are compared to District forecasts, generated by District Systems Traffic – both for model projections and historic trends – to ensure the volumes make sense.

- Historic trends – At least 5 years of data are required to develop future traffic volumes. This method must be used with caution relative to past growth trends in the surrounding area.
- Model projections – Use of the most updated and validated model is required. Demographic growth surrounding the project area is analyzed by comparing the zonal data of the LRTP horizon year to the base year. After the model run, traffic volume growth rates for each link are generated by comparing the LRTP horizon year traffic volume to the base year traffic volume. This step requires an understanding of the transportation network changes surrounding the project area.
- Vested or approved trips – Most Districts rely on local governments to require the provision of approved trips in traffic impact analysis and assume it is included if it's available. For DRIs, the ECFRPC requires that if several DRIs are being considered in the same area, they must include 75% of the other DRIs' trip generation in addition to approved traffic from the appropriate local government(s). A minimum of a 2% background growth is also generally required.

Several issues regarding traffic volume data were noted:

1. As with any statistical or mathematical method, the assumptions that go into the calculations determine the result. Data that are not available and must be gathered or estimated can result in biased results depending on the interests of those doing the analysis.
2. Traffic volumes collected during congested periods are not the actual demand. This concern is similar to that expressed regarding the K factor in urban areas.
3. Because today's traffic is already higher than what the Bureau of Economic and Business Research (BEBR) at the University of Florida population forecasts would indicate, BEBR caps are problematic.

⁵ Florida Department of Transportation. "Manual on Uniform Traffic Studies." Available online: <http://www.dot.state.fl.us/trafficoperations/Operations/Studies/MUTS/MUTS.htm>

Consultation and Mitigation Procedures and Issues

Transportation Concurrency Alternatives

Florida's growth management legislation provides several transportation concurrency alternatives, including Transportation Concurrency Exception Areas (TCEAs), Transportation Concurrency Management Areas (TCMAs), and Multimodal Transportation Districts (MMTDs). Most FDOT Districts have not yet been asked to provide concurrence on mitigation for impacts to SIS and TRIP facilities while others are providing preliminary comments on TCEA updates. Although a number of TCEAs exist, most were established prior to the 2005 Growth Management legislation. Some Districts are just beginning to get involved in the update of existing TCEAs and have no formal process for their review or evaluation.

During the 1990s, District 4 established an informal review process for reviewing TCEAs. Once contacted by a local government, a "pre-application" meeting would be scheduled, sometimes along with a methodology meeting. Topics discussed included the size of the boundaries, how to model impacts, and how impacts to the FIHS should be considered (prior to establishment of SIS & TRIP). They also distributed Broward County's TCEA for interested local governments to use as a guide in preparing analysis and draft goals, objectives, and policies. Broward County delineated east of I-95 (north of Commercial Boulevard) and east of Florida's Turnpike (south of Commercial Boulevard) as the TCEA area to relieve the LOS standard for the TCEA area and promote transit.

Only one District reported experience with an MMTD. In this case, there is ongoing concern regarding the lack of any way to measure the effectiveness of the MMTD.

In general, few local governments contact FDOT to coordinate regarding TCEAs, TCMAs, or MMTDs prior to submitting comprehensive plan amendments addressing them. Many are ill-equipped to document methodology, prepare a transportation impact analysis, or address and ensure delivery of mobility options as required by the 2005 growth management legislation. In addition, many local governments have come to view these alternatives as "a concurrency out" without attendant responsibilities for contributing to mobility. One interviewee pointed out the "lack of a plan or policies to implement for mitigation within TCEAs, especially as it relates to proportionate share."

Issues identified include:

1. The blue guidebook, "Working with Transportation Concurrency Exception Areas," provides a checklist of issues to be addressed in reviewing TCEAs; however, it doesn't describe FDOT authority, how to identify and ensure the adequacy of proposed mitigation strategies, or how to work with local governments.
2. How should area boundaries be drawn? Often, boundaries appear to be drawn to achieve local government goals related to development but otherwise make little sense.
3. If impacts to SIS or TRIP facilities are not mitigated, what is FDOT's authority to ensure mitigation are enforced?
4. Mitigation mainly focuses only on capital improvements although on-going operations and maintenance costs need to be considered.

One example of improving mobility within a TCEA occurs in Orlando through the DRI process. Because most of the City of Orlando is within a TCEA, the ECFRPC works with city staff during the DRI review process to determine where deficiencies are or will occur and to determine appropriate

mitigation whether it is transportation demand management (TDM), transit, or rail. For example, Health Central DRI (Florida Hospital with a residential component) committed to build a commuter rail stop. Although ECFRPC staff was uncertain about any capital improvements planned by the city, they know that Orlando wants to improve headways for transit, limit physical (capacity) improvements to intersections, and emphasize walkability.

Mitigation for Impacts to SIS and TRIP Facilities

District staff reminded us that local governments usually do not involve FDOT in non-DRI development review, so the extent of the impact of non-DRI development is unknown to FDOT. FDOT staff review developments for pending impacts and seek mitigation mainly through the DRI review process. Many Districts were also quick to point out that there is no specific method for mitigating impacts to SIS and TRIP facilities outside of the DRI review process despite the proportionate fair-share mitigation clause in the 2005 growth management legislation. Further, FDOT staff believe that mitigating development impacts for SIS and TRIP facilities is not really different from the mitigation requirements that FDOT has been requiring on the SHS for years. Most mitigation has been accomplished through the DRI review process. In fact, from the ECFRPC's perspective, if mitigation on a SIS or TRIP facility is required, FDOT must be satisfied with the proposed mitigation.

Nonetheless, FDOT involvement in determining mitigation improvements and costs will undoubtedly increase as recently-adopted proportionate fair-share mitigation ordinances come into play. Districts that have been involved in the application of proportionate fair-share mitigation note that the cost of mitigation determined through this method is often higher than developers can afford.

In terms of identifying the type of improvements that would be acceptable for mitigation of transportation impacts to SIS and TRIP facilities, Districts find off-system improvements, particularly parallel facilities, acceptable. This is likely due to the ease of measuring the effectiveness of the mitigation through modeling. One District pointed to intelligent transportation system (ITS) improvements, such as variable signage, as accepted mitigation despite the lack of ability to measure their effectiveness. One consultant noted difficulty in defining the capacity benefit of off-system improvements and, further, distinguishing "new capacity from safe and reasonable access when the parallel improvements are on-site." In other words, it is difficult to distinguish the extent to which an off-system improvement provides benefit to an on-system facility or whether it just benefits the development.

On the other hand, although many Districts would like to allow transit improvements as mitigation, they often have no opportunity to do so or they have no method of measuring the effectiveness of transit as a mitigation tool. As previously mentioned, District 4 has developed a toolbox of TDM and TSM strategies with Palm Beach County to improve connectivity. They are also developing TOD guidelines. In any case, most Districts do not track whether or not required improvements are actually constructed or if mitigation contributions are collected. This is primarily due to lack of resources to monitor every development that has been conditionally approved.

Emphasis on protection of mobility on SIS facilities has caused development to be shut down in some communities where a SIS facility is impacted. In the city of Newberry, SR 26 currently exceeds the adopted level of service C on the two-lane cross section in the City's downtown area. Because nearly all developments in the area would place some trips on SR 26, the City is facing a concurrency moratorium on development until a solution can be devised. City efforts to address the situation through concurrency alternatives, such as an MMTD or TCEA, have not met with State approval due to the potential impacts on the SIS.

Some approaches to mitigating SIS impacts have been or are currently being developed on the southeast coast in Broward, Palm Beach, and Martin Counties. The first is an example of an alternative approach to concurrency developed by Broward County. The second is an example of combining long-term concurrency management and a TCEA to address SR 710, a corridor that connects an urban area with a rapidly developing area.

Broward County addresses transportation concurrency using two types of concurrency districts: transit-oriented concurrency districts, and standard concurrency districts. Within the Broward County Code, these districts are defined both geographically and conceptually. A Standard Concurrency District is an area where roadway improvements are anticipated to be the dominant form of transportation enhancement. A Transit-Oriented Concurrency District is a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips. The distinction is important, because each type of concurrency district carries with it a different set of standards for adequacy determination. The LOS for roadways are conventional, whereas, the relevant LOS standards for transit-oriented concurrency districts address transit headways and the establishment of neighborhood transit centers and additional bus routes, and are broken down on the individual district level.

The county charges an assessment, the Transit Concurrency Assessment (TCA), as a vehicle for meeting concurrency requirements in Transit-Oriented Concurrency Districts. The ordinance requires that proposed development with transportation impacts that cause LOS standards to be exceeded contribute to transit in accordance with the plan. Revenues from the TCAs are used to fund enhancements to the County Transit Program (established by the County Commission) located in the district where the proposed development will occur. One problem area that results from this approach is congestion where principal arterials intersect with SIS facilities. The focus on transit prevents funding from being spent on intersection improvements.

District 4 has begun a comprehensive approach to mitigating pending adverse impacts to SR 710, a SIS facility and critical arterial that heads west from West Palm Beach in Palm Beach County, west through Indiantown in Martin County. There is development pressure (totaling more than 25,000 residential units and approximately 6,000,000 square feet of non-residential) from both existing and proposed development - all of which will rely on this facility for access to the east. Pending transportation impacts will cause this facility to fail very soon. Because SR 710 runs through an area that is designated as rural, the rural LOS standard applies. District 4 is working with the Central Office regarding a change in designation for the area from rural to transitioning.

Palm Beach County requested FDOT's assistance in mitigating pending impacts leading to a meeting early this year with Palm Beach County, Martin County, DCA, FDOT Central Office, and the Treasure Coast Regional Planning Council (TCRPC) in attendance. During this meeting and since then, these stakeholders have been working on a "road map" or series of strategies to mitigate impacts to SR 710. The road map allows a temporary reduction of LOS on SR 710 but then requires LOS to be restored in 10-15 years. The strategy to mitigate adverse impacts applies a two-pronged approach: 1. Martin County will investigate the feasibility of designating SR-710 as a TCEA as defined by Chapter 163.3180(5) F.S; and 2. both Martin and Palm Beach Counties and FDOT would work in partnership to agree and reach a consensus on future traffic, ultimate cross-section, and associated funding and timing of construction for various segments of SR 710. It is anticipated that this plan will include money earmarked for SIS plus contributions from local governments and developers.

The topic of consultation and mitigation revealed a number of issues and concerns currently affecting FDOT staff review:

1. What does “concurrence” mean and how is it conveyed? No District had a specific means of determining concurrence or method of conveying concurrence with a local government regarding the acceptance of proportionate fair-share mitigation for impacts to SIS and TRIP facilities. Districts did believe concurrence was conveyed in cases where a local government, a developer, and FDOT signed an agreement for an improvement to mitigate transportation impacts.
2. What does “consultation” mean and how is it conveyed? No District had a specific means of determining consultation with a local government regarding a TCEA, TCMA, or MMTD proposal or procedure for cooperatively develop a plan to mitigate impacts to SIS and TRIP facilities.

Renaissance Planning Group is in the process of developing an MMTD for Boca Raton. The proposed methodology for analyzing impacts to SIS facilities includes using the travel demand model to estimate incremental traffic impacts to the SIS based on the development assumptions within the MMTD and performing a capacity analysis using the generalized LOS tables as a first-tier screening. This is similar to the approach they used in Kissimmee where the impacts were not significant and warranted no further analysis. At this time, the analysts believe that the possible impacts may be more significant and warrant further analysis. In this case, additional methodologies may include an averaging technique or more refined assumptions about internal capture and operations.

3. It is difficult to determine points at which transportation improvements must be in place before additional development can occur, particularly in light of what some staff have called an “unrealistic” timeframe of 3 years between development approval (transportation impacts) and transportation improvements being in place.
4. Determining the cost of needed mitigation can be a challenge. How to establish the cost of an improvement whether it is for DRI proportionate share mitigation or the new proportionate fair-share share mitigation for concurrence is an area of concern.
5. Is it feasible to maintain the LOS standard on a SIS facility through a downtown area? If not, what are viable solutions to provide mobility? FDOT staff recognizes that maintaining a high level of service through a downtown area is extremely difficult, if not impossible. Guidance is sought regarding what specific mobility strategies will be acceptable.
6. Local governments continue to approve development that has not demonstrated adequate capacity on the transportation system and/or to accept inadequate funding for mitigation. FDOT staff seeks guidance regarding their authority in dealing with these situations.
7. What level of transit will mitigate impacts? It may be necessary to define a general rule. This may require further, detailed study to determine what mitigation transit actually provides.

Methods to Require/Collect Contributions for Transportation Improvements

Most Districts pointed to the DRI proportionate share formula as the main mechanism for obtaining contributions for transportation improvements. Some Districts obtain annual amounts in excess of \$100 million to be used for roadway projects. Agreements are documented in local government development orders (DOs) where the DO is amended to include the proportionate share agreement or through joint participation agreements (JPA) adopted by the parties involved. Some Districts noted the importance of having FDOT attorneys involved to protect FDOT interests. Right-of-way is often

accepted in lieu of monetary contributions. Consultants noted a variety of financing mechanisms used toward transportation improvements (roadway) including impact fees, proportionate share, benefit assessment, community redevelopment agencies (tax increment financing), and community development districts.

District 3 has been working on an umbrella agreement, a memorandum of understanding (MOU), with a local government regarding the implementation of proportionate fair-share mitigation on several corridors. This MOU will allow the local government to start collecting proportionate fair-share contributions with individual project agreements to be entered into at a later date. District 1 also recently entered into agreements to accept proportionate fair-share payments for SR 82 (Lee County and Fort Myers) and for SR 64 (Manatee County).

One example of developers contributing to mitigation occurred in District 7 prior to the 2005 growth management legislation. Hillsborough County entered a public-private partnership with developers along US 301 aimed at coordinating concurrency mitigation projects across several major developments with vested status along the corridor. A stimulus for the program was the fact that each development was widening the corridor along impacted segments, resulting in variations in laneage and corresponding safety problems. Because these segments needed to be tapered, and then later would need to be reconstructed, there were cost savings to all of the developers to pool their resources and coordinate on the overall road widening project needed to serve their developments.

Costs were estimated using FDOT's Long Range Estimating (LRE) model for the desired cross section based on new average daily trips generated by the development and inflated to 2008 values. Each developer was required to pay their fair share into an account that was earmarked for this purpose. Participating developers were also allowed to construct their share of the improvement as an alternative to paying into the account. The account allowed the County to make loans to FDOT, who then paid back the loans in the 4th or 5th year of their budget, thereby moving the project up 10 years in the FDOT work program.

Major Challenges

Each interview participant was asked to identify what they felt were the major challenges for improving mobility on SIS, TRIP and other facilities and how they might address those challenges. These interview findings and observations of the research team are summarized below.

Inadequate funding for capacity and/or mobility improvements. This was the most commonly mentioned challenge. The cost of roadway improvements has far outstripped existing revenues highlighting the need for mitigation strategies that encourage travel off of SIS and TRIP facilities, emphasize other modes of travel, and apply creative funding mechanisms. As limited funding is stretched through programs like TRIP, local governments even have difficulty obtaining the required match. Solutions offered included public-private partnerships and user fees and tolls for expansion and new facilities. The need for dedicated transit operations revenue sources was also noted along with the need for additional state funding for transit as incentives to local governments that adjust their land use policies to make transit more viable.

Minimal understanding of the ultimate needs of the transportation corridor or system. Few comprehensive plan transportation elements, MPO long range plans, or corridor plans address the ultimate needs of any given corridor such as transit, increased local road connectivity, or improved walk-ability. Establishing these needs through the planning process will provide a basis for improving mobility through the development review process (whether through ROW donation, proportionate-

share agreements, or development design standards). Local governments will need to establish effective multi-modal design standards for development and dedicate the resources necessary to operate increased transit or multi-modal options. These issues may be exacerbated by limited availability of technical transportation planning expertise.

Lack of attention to regional transportation issues and solutions. Many local governments get bogged down with local issues at the expense of regional-level issues impacting mobility on TRIP and SIS facilities. Little intergovernmental coordination occurs regarding shared facilities and the multi-jurisdictional impacts of large developments. In addition, there is often a disconnect between the comprehensive planning/development review processes conducted by local governments and the metropolitan transportation planning process conducted by MPOs.

Statutory requirements and/or limitations are sometimes obstacles. Mitigation of transportation impacts, whether it be increasing roadway capacity or provision of new transit service, is complex and often takes many years to accomplish. If additional capacity is required that has not been identified in an existing plan, construction often cannot occur within the three years required by Florida statute. As a result, development may be subject to moratorium such as in the Newberry example. More flexibility in the law may allow for the phasing of improvements by developers and public agencies.

Lack of communication on all levels. Many interviewees noted a lack of communication at various points in the review process and between and among various groups, ie., FDOT districts, local governments, and MPOs. Solutions offered include increased coordination early in the process, sharing of effective solutions, and more cooperation on regional transportation issues.

CONCLUSIONS AND WORKING CONCEPTS

The review of literature revealed extensive information regarding site impact and level of service analysis as well as guidance on analyzing and addressing TCEAs, MMTDs, and incorporation of multimodal solutions into various development solutions. The interviews regarding current practices provided insight into FDOT site impact and level of service analysis as well as concurrence on SIS and TRIP mitigation. FDOT staff are clearly frustrated by the lack of authority to effectively implement the mandate to maintain mobility on the SIS through development review processes.

Those interviewed expressed a variety of concerns on these topics; however the main concern was how to deal with mitigation of impacts to the SIS. Their question is what constitutes acceptable mitigation of adverse transportation impacts on SIS and TRIP facilities? Clear direction on FDOT policy and preferences relating to SIS/TRIP mitigation is needed both from a statewide perspective and from individual District perspectives (given variation of circumstances across the state).

When transportation impacts affect the SIS, the 2005 growth management legislation directs local governments to "...in cooperation with the Department of Transportation, develop a plan to mitigate any impacts to the Strategic Intermodal System, including, if appropriate, the development of a long-term concurrency management system ..."⁶ and further requires concurrence on proportionate fair-share mitigation. Such a process should provide guidance on the use of existing methods for addressing multimodal solutions in development review to create acceptable plans for mitigating impacts to SIS and TRIP facilities. The process should also identify circumstances under which mitigation plans are acceptable particularly in instances where additional impacts to an overcapacity SIS roadway would be allowed. Guiding principles may be to champion effective mitigation strategies, to recognize valid mitigation proposals, to provide better certainty of outcomes, and to streamline administration using the working concepts outlined below:

Similar to the DRI process, concurrence requirement affords FDOT the opportunity to "sit at the table." One concern of many FDOT staff is the impact of land use decisions made by local governments on the transportation system. FDOT now has the opportunity to engage in meaningful dialogue with local governments and assist them in creating viable transportation systems while maintaining or improving regional and statewide mobility.

Focus on building and maintaining relationships/partnerships. Guidance on how to get involved in local government planning processes and how to look for opportunities to collaborate more proactively on transportation needs and issues will benefit FDOT staff. Learning to work effectively with all local governments, transit agencies, RPCs, and MPOs with each District will facilitate collaborative efforts for regional planning and coordination.

Provide data, tools, and other technical assistance to local governments and transit agencies. Many local governments lack the technical expertise, access to data, or understanding of the mechanisms available for addressing transportation issues. FDOT is well positioned to serve the technical assistance needs of these communities and provide guidance to advance local government ability to address transportation needs. Some Districts, for example, provide regular updates regarding the latest data on transportation costs relative to the area. Such information is invaluable to local government staff and helps to ensure that local governments have accurate data when evaluating costs for proportionate fair share mitigation. Opportunities for FDOT to serve in a technical assistance role

⁶ Section 163.3180(4)(f), (7), and (15)(a) Florida Statutes.

occur on a variety of levels. Key opportunities occur during project development or planning studies (e.g., corridor management studies), review of DRI applications, review of comprehensive plan amendments, and during requests for FDOT concurrence on local actions affecting the SIS in the areas of proportionate fair-share mitigation and adoption of concurrency alternatives.

Develop a “menu” of mitigation options. Just as every community has its own unique characteristics, the mitigation plan for each community will be unique striking a balance between mobility and community livability goals. Mitigation options should include everything from improving local road connectivity to ramp metering and new transit routes to bicycle lockers. There is no “silver bullet,” or any one strategy that will provide lasting mobility solutions.

Work with local governments to develop and implement corridor plans. The development of effective corridor plans to improve mobility requires both technical expertise and funding – resources not available to many local governments. FDOT must be willing to assist local governments where necessary to reach their mobility goals – particularly since most state transportation funds have been redirected to the SIS. Corridor plans will result in a list of detailed improvements that are needed to achieve the desired mobility. In turn, the list of improvements can be used to determine cost for proportionate fair-share mitigation and other developer contributions.

Apply alternative approaches to measuring impacts to the SIS. Level of service analysis still typically focuses on roadway capacity for automobiles despite the availability of analysis tools for alternative modes in the Q/LOS Handbook and the Multimodal Transportation Districts and Areawide Quality of Service Handbook. Using these alternatives has the potential to reveal unused capacity in the vicinity of overcapacity arterials. For example, improving the quality of service of the alternative modes (i.e., bus headways) may make them more appealing to travelers resulting in improved mobility throughout the corridor. In addition, concurrency alternatives, such as an areawide Q/LOS standard for all non-SIS roads, could be applied in specific areas, particularly within TCEAs, TCMAAs, and MMTDs.

Include a definition of and specific requirements for transit-oriented development (TOD). Such a definition and requirements could be developed similarly to the Multimodal Transportation Checklist found in the *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (FDOT 2004). Such a checklist would provide clear parameters for establishing and maintaining an effective TOD. The TOD plan should include corresponding transit agency capital plans and commitments to provide meaningful service.

Consider access and mobility issues on SIS Connectors in relation to the functions of related hubs. SIS Connectors, by definition, connect SIS Corridors (i.e., interstates) with either passenger or cargo hubs. Some SIS Connectors will require greater focus on accommodating large freight-moving vehicles such as semi-trucks and tractor-trailers and are unlikely to be pedestrian- and bicycle-friendly. Meanwhile passenger hubs such as a Greyhound Bus Station, rail passenger station, or cruise terminal may be residential and retail oriented with more focus on pedestrian and local transit amenities.

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APPENDIX A: LITERATURE REVIEW

▪ **2002 Quality/Level of Service Handbook (Florida Department of Transportation, 2002)**

The Quality/Level of Service (Q/LOS) Handbook and its accompanying software allows planners, engineers and decision-makers to develop and review Q/LOS for multimodal transportation roadway service at planning and preliminary engineering levels. The multimodal approach can provide Q/LOS evaluation techniques for pedestrian, bus, bicycle and automobile at facility and segment levels. The Handbook deals with both the quality of service (QOS) and the level of service (LOS) roadways provide to roadway users. The Handbook does not address the overall “quality of trip experience” such as neighborhood safety and appearance, and social and aesthetic amenities that transportation planners and engineers do not directly affect.

The Handbook provides Q/LOS evaluation techniques at a generalized and a conceptual level. The generalized planning level is intended for broad applications such as statewide analyses, initial problem identification, and future year analyses. It makes use of statewide default values. The Handbook includes Florida’s Generalized Tables which are the primary tools for conducting this type of planning analysis and represent the most appropriate statewide values. The automobile/truck portions of the Generalized Tables were developed based on the definitions and methodology of the Highway Capacity Manual 2000. The values shown in the Generalized Tables for bicycles, pedestrians and buses are based on national and state research for those modes. There are generalized tables for Daily LOS Volume, Peak Hour Two-Way LOS Volume, and Peak Hour Directional LOS Volume. Each of these tables consists of five area types grouped into three tables:

1. urbanized areas;
2. areas transitioning into urbanized areas, or cities over 5,000 population not in urbanized areas; and
3. rural undeveloped areas, or cities and developed areas less than 5,000 population.

Conceptual planning is more detailed and accurate than generalized planning, but does not involve comprehensive operational analyses. Conceptual planning is used in determining the design concept and scope for a facility. The Handbook contains information for Florida’s LOS planning software (LOSPLAN), which includes ARTPLAN, FREEPLAN, and HIGHPLAN. ARTPLAN is designed for arterial planning, FREEPLAN is designed for freeway planning and HIGHPLAN is designed for uninterrupted flow highway planning,

The Handbook includes a section on Florida’s planning level of service standards including a table of the level of service standards for different roadway infrastructure in different area types as reflected in Chapter 163, F.S. Note that LOS standards in Rule 14-94 were updated in May of last year.

▪ **Growth Management and Level of Service Issue Papers – Draft (Florida Department of Transportation, January 2007)**

Purpose of Papers

This compilation of issue papers is FDOT’s effort to provide technical guidance in applying the changes in the 2005 growth management legislation to planning and preliminary design tasks. It is intended to accompany the updated LOSPLAN analysis software and act as a guide until the 2002 QLOS Handbook can be updated to reflect the legal changes. The guidance, which is targeted to FDOT and FDCA staff, MPOs, local governments, and the private sector, is intended to be applied

immediately. It is divided into 13 sections (12 of which are discussed below), and gives guidance on the updated Rule 14-94, FAC Minimum LOS Standards and statewide consistency in analysis approaches.

Impact of Growth Management Act of 2005 (SB 360)

This paper provides an overview of the impact of Florida’s recently passed act, which tightens the requirements on Capital Improvement Element amendments and financial feasibility. The Act will require FDOT to play a greater role in assisting local governments to ensure that they are meeting concurrency requirements, especially as they apply to the SHS, FIHS, and SIS. This increased responsibility is expected to impact how FDOT manages planning resources in the future.

Overview of Capacity and LOS Techniques

The paper provides a succinct, yet very general overview of various capacity and LOS tools and illustrates which one may be best suited for particular planning needs.

Highway System Structure Terminology Related to Highway Capacity and LOS Analyses

This paper briefly discusses the hierarchical structure for highway systems with respect to software analysis tools. It also provides some quick insight into section and highway analyses.

Area Type

This paper addresses three different area types – urbanized/urban, transitioning, and rural – used in the Q/LOS Handbook and software, as well as the distinguishing characteristics of each. These classifications help users understand how to categorize the roadway facilities they are analyzing. FDOT Districts are given latitude in modifying area boundaries in situations where small roadway segments exist. FHWA guidance on this matter is also given on how such segments should be handled.

Partitioning of Roadways for LOS Analysis (Segmentation)

This paper provides an introduction to roadway partitioning. It defines the three roadway facility types based on the Highway Capacity Manual (HCM): arterial, freeway, and highway. The document provides thresholds and termination examples of each facility type. It also offers guidance on how to analyze specific roadway scenarios.

Guidance on Applying Capacity and LOS Tools in Planning Stages

This paper highlights the applications of the two supported analysis tools – FDOT’s Generalized Service Volume Tables and LOSPLAN software – used for planning and preliminary engineering. These software tools are specifically calibrated to reflect Florida conditions. The Highway Capacity Software (HCS) is also supported, should one need to analyze the impact of a signalized intersection on a development. The summary cautions users against mixing software that are appropriate only for specific uses (see the issue paper, “Overview of Capacity and LOS Techniques,” for more information) and using unapproved software not supported by FDOT.

Applicability of FDOT’s Statewide Minimum LOS Standards for Roadway LOS Analyses

This paper gives general guidance on when to apply section or point LOS analyses. It then extends that guidance into signalized intersection analyses and the application of FDOT LOS standards to TRIP-funded facilities.

LOS Analyses for Strategic Intermodal System (SIS) Connectors

This section is a one-paragraph explanation of how to evaluate SIS connectors that conform to certain criteria.

Maximum Acceptable Capacity Volumes

This paper provides users further guidance on FDOT's accepted capacity thresholds for roadway facilities by area type; special arterial and highway considerations with regard to effective green (g/C) ratios; capacity considerations for certain freeway design features; updates to the 2007 LOSPLAN software package regarding capacity and LOS thresholds; and the consideration of volumes greater than those acceptable to FDOT for SIS connectors or FIHS or TRIP facilities.

Minimum/Maximum Acceptable Input Values

This paper provides guidance on acceptable input values for capacity and LOS analyses. These guidelines should be considered in conjunction with values established in the previous paper, "Maximum Acceptable Capacity Volumes." Minimum acceptable planning analysis hour factor (K100) and directional distribution factor (D100) values are discussed. Additionally, maximum g/C ratio values are provided, as well as their acceptable ranges whether for an individual intersection or numerous intersections located along a facility.

Future Year Capacity/LOS Analyses

This issue paper give analysts insight on factors to consider to appropriately select future year input values for AADT, K100, directional distribution factor (not specifically for 100th highest factor, D100), g/C, and signal density. Appropriate analytical tools are also discussed, and some commentary is made on the use of certain analysis tools with respect to SIS and other major facilities.

Obtaining and Determining Key Highway Capacity/LOS Input Data (Use of Field Data and Other Data Sources) (Specific Variable Input Guidance)

This final issue paper provides users some guidance on the key analysis input values and acceptable approaches to obtain them.

▪ Highway Capacity Manual 2000 (Transportation Research Board, 2000)

The Highway Capacity Manual (HCM) provides transportation practitioners and researchers with a consistent system of techniques for the evaluation of the quality of service on highway and street facility. HCM does not set policies regarding a desirable or appropriate quality of service.

The Highway Capacity Manual (HCM) contains techniques for estimating capacity and determining level of service for many transportation facilities and modes, including basic freeway segments, freeway weaving, ramps and ramp junctions, freeway facilities, multilane highways, two-lane highways, signalized intersections, unsignalized intersections, urban streets, transit, pedestrians, bicycles, and interchange ramp terminals.

HCM 2000 is organized into five parts:

1. Part I is an overview that introduces the basic capacity and level-of-service (LOS) concepts.
2. Part II includes a discussion of basic capacity parameters for each facility type. It also recommends default values that may be used in the absence of actual field data, and example service volume tables for use in general planning applications. This section also includes a discussion of the accuracy and precision that can be expected from each of the analysis procedures described in HCM 2000.

3. Part III contains step-by-step procedures recommended for evaluating each of the different facility types, including both uninterrupted and interrupted flow facilities.
4. Part IV is for corridor and area wide analyses, it presents methods for aggregating the results of analyses conducted under Part III into facility, corridor, and/or area wide assessments.
5. Part V suggests appropriate applications of simulation models and provides numerical examples.

As a companion to this manual, commercial software is available to perform the numerical calculation for the chapters of Part III. The Highway Capacity Software (HCS+) is developed and maintained by McTrans as part of its user-supported software maintenance as a faithful implementation of the Highway Capacity Manual (HCM) procedures. HCS+ is a program used by engineers and planners to analyze capacity and determine LOS for Signalized Intersections, Unsignalized Intersections, Urban Streets (Arterials), Freeways, Weaving Areas, Ramp Junctions, Freeway Facilities, Multilane Highways, Two-Lane Highways, and Transit. The latest HCS+ also includes the LOSPLAN, and CORSIM animation in Signals, Unsignal, Freeways, Ramps and Weaving.

- **Impact Fee Credits for Livable Communities Improvements: Technical Memorandum #1 and Final Technical Memorandum (Center for Urban Transportation Research, 2005)**

These technical memoranda reviewed various literature and current practices documenting nationwide transportation-related impact fee credit and exemption programs and provided recommendations applicable to the Pinellas County Metropolitan Organization’s goal of improving community livability. Impact fee credits allow local or municipal jurisdictions to reduce fees that a developer might otherwise have incurred, provided the transportation mitigation is related to traffic impacts that a potential development will generate. Since this funding source is applicable to local and municipal government initiatives, state DOTs are not entitled to receive direct payments. Nonetheless, this funding mechanism can benefit level of service impacts along state transportation facilities—such as SIS and TRIP facilities—that are within the jurisdiction of those governments assessing the fees.

The Pinellas County MPO 2025 LRTP has numerous goals, objectives and policies that relate to multimodal transportation and development issues. Several of these policies call for “encouraging” multimodal and livable communities strategies at the local level through the land development and transportation planning process. Principles in Pinellas County MPO’s Livable Communities Initiative that relate to these strategies and apply more directly toward improving mobility on and around state transportation facilities include mixing land uses and providing a variety of transportation choices. Numerous documents were summarized pertaining to these two principles.

Land Use Mixing

Two studies were selected that are applicable to the goals of evaluating LOS on the state transportation system. They provide insight on the affects of Transit Oriented Development (TOD) and Traditional Neighborhood Development (TND) on vehicle trips. The first study, conducted by Kittelson & Associates, Inc. for FDOT District 4, actually summarizes key points of the second study, Transit Cooperative Research Program (TCRP) Report 95, which considers the “3D’s” of transit oriented development – density, diversity and design. Highlights of both will therefore be combined for this memorandum.

The Kittelson study documented how transit supportive design influences impacts trip generation, specifically internal capture rates. Of particular relevance were the following findings from Chapter 15 “Land Use and Site Design” of TCRP Report 95:⁷

Kittelson summarized the density research with the following:

“Research has shown that vehicle miles of travel (VMT) can be reduced by 10% if traditional neighborhood developments (pedestrian friendly environments) are used instead of conventional planned unit developments.”

The balance between jobs and housing in land use diversity was found to play an important role by reducing VMT ranging from 7-30% reduction. Kittelson notes a land use mix relationship to mode choice through these findings: Cervero in 1989 suggested that centers with some on-site housing had 3-5% more transit, bike, and walk commute trips. He also concluded that for every 10% more commercial or retail space, transit and ridesharing increased around 3 percentage points. Parsons Brinckerhoff and Cervero in 1996 suggested that proximity is [the] most important consideration in choice of non-motorized modes.

Regarding design, the Kittelson study found the following:

“JHK Associates and K.T. Analytics found in 1993 that improved pedestrian access could reduce vehicle trips by 1-3%. Parsons Brinckerhoff concluded in 1993 that VMT could be reduced by 10% by changing pedestrian environmental factors from average to very pedestrian friendly. In 2001, Ewing and Cervero found that sidewalk completeness, route directness, and network density have vehicle trip elasticity of -0.05 and VMT elasticity of -0.03.”

The Kittelson research concluded, “...there is no conclusive body of knowledge that provides quantitative guidance as to the amount of internal capture that can be expected relative to the density of development, diversity of development, or design (connectivity) of development.”

The reports above provide information regarding the impacts of different types of development on factors such as vehicle miles traveled, travel time, and trip generation. TCRP Report 95 further points to the benefits of connectivity (such as that of a TND): factors such as VMT, trip length and vehicle hours traveled are reduced from 15-57%.

Provisions for Various Transportation Choices

Three studies were selected that are applicable to the goals of evaluating LOS on the state transportation system. They provide insight on the affects of enhanced interconnectivity and reduced arterial traffic. The first study, which was published in TRB Circular E-C109: Urban Street Symposium, analyzed the effects of various street designs and classifications on transportation system performance.⁸ Five geographical areas within the Portland, Oregon MPO jurisdictional boundary were selected, and the effects of increasing or reducing connectivity were observed. The analysis found that increasing the number of street intersections per mile to a range of between 10 and 16 street connections per mile could reduce delay by 17% overall; decrease arterial traffic by 13%; and increase the percentage of regional traffic (versus local traffic) on arterials. These were significant findings because they emphasized that even modest improvements in connectivity can benefit local and

⁷ Florida Department of Transportation/Kittelson & Associates Inc. Trip Generation for New Urbanist Developments. Viera, FL: District 4, Florida Department of Transportation and Kittelson & Associates Inc., August 2004.

⁸ Kloster, Tom, James Daisa and Rich Ledbetter. Linking Land Use and Transportation through Street Design. TRB Circular E-C019: Urban Street Symposium, December 2000.

regional travel in addition to walking, bicycling, and transit access. Based on this analysis, the MPO established regional street design policies to guide the eventual design of major streets in the 24 jurisdictions that make up the Portland metropolitan area.

The second study examined the effect of local residential street connectivity on arterial traffic volumes.⁹ The study involved creation of a travel demand analysis of local street networks in Tallahassee as part of a regional travel demand model. Local streets were coded in detail and then hypothetical new links were added to enhance connectivity. Various speed combinations for local and arterial streets were tested to identify the impacts on local and arterial flows. The study found that “changes in connectivity will reduce trips by a fixed amount” and that traffic volumes are highly sensitive to speed on the arterial and residential streets.

The third study provided insight on the transportation impact of access management techniques.¹⁰ Based on a literature review conducted for the study, driveways impacted roadway traffic by reducing speed from between 1.0 to 2.0 mph. Additionally, it was noted that the Highway Capacity Manual allots speed reductions of 0.15 and 0.005 mph per access point and per right-turning movement per hour per mile of road, respectively. This information could be translated into a value related to the impact of driveways on roadway level of service.

Recommendations

Following the presentation of Technical Memorandum #1 to the Livable Community Task Force, both CUTR and the Task Force developed a table entitled, “Recommended Livable Community Provisions for Existing Policies/Regulations,” as a possible direction for the Task Force. This table listed the livable community provisions previously developed by the Task Force and assigned a recommended action for each provision within the Transportation Impact Fee Ordinance (TIFO), Transportation Management Plan Strategies and Land Development Regulations. The recommendations were adopted by the Pinellas MPO and Pinellas Board of County Commissioners, with a few changes.

The following are additional recommendations given by the researchers to address the changes made to the table and give further insight to the MPO based on the research conducted for Technical Memorandum #1 and at CUTR. The recommendations listed below address areas of interest to FDOT, as they can lead to improved mobility and reduce the impact of local traffic on state transportation system.

1. *Increase the number of alternative transportation projects in long range plans:* Additional alternative transportation projects could be developed and included in comprehensive plans or MPO plans thus making the projects eligible to receive TIFO credit. For example, Pinellas County could identify gaps in the sidewalk and bicycle systems and add them to the MPO long range plan and/or bicycle pedestrian plan. Not only would this increase the number of improvements eligible for impact fee credits, it would clarify where connections are needed and thereby help establish network continuity within and across jurisdictions.
2. *Develop Model Ordinance Language:* Model ordinance language to promote the Livable Communities Initiative may include general requirements, land use, street network and connectivity, traffic calming, parking, transit facilities, sidewalks and pedestrian facilities, bicycle facilities, amenities and design, and incentives.

⁹ Alba, Carlos and Edward Beimborn, “Analysis of the Effects of Local Street Connectivity on Arterial Traffic”, Proceedings of the 84th Annual Meeting of the Transportation Research Board, January 2005.

¹⁰ Gluck, J., H. Levinson and V. Stover. NCHRP Report 420: Impacts of Access Management Techniques. Transportation Research Board. Washington, D.C.: National Academy Press, 1999.

3. *Increase Connectivity*: A more connected local street network and the creation of walkable city blocks can enhance livability, support alternative modes of transportation, and reduce congestion on major roadways by providing alternate routes for short local trips.
4. *Establish Multimodal Districts*: In multimodal transportation districts, concurrency determinations may be based on multimodal performance measures that consider all of the available modes of transportation, including walking, biking and transit.

- **Incorporating TDM into the Land Development Process (National Center for Transit Research at the Center for Urban Transportation Research, August 2005)**

This report, also developed by CUTR's National Center for Transit Research, aims to investigate proactive measures that TDM professionals can use to influence the incorporation of TDM into the land development process. It provides a review of available literature and policies related to various plans and regulations; analyzes relevant case studies that highlight negotiations between local governments and land developers; and outlines general findings as a result of the research.

The report offers suggestions to TDM professionals that include providing their expertise on the benefits of TDM to land development to government officials and appropriate stakeholders. This would entail insuring that TDM personnel are kept abreast of all relevant activities pertaining to TDM measures through coordination, cooperation, and communication. One recommendation calls for developing professional relationships. This is an opportunity where TDM professionals can encourage FDOT District staff to consider TDM measures that aid in improving mobility along state facilities within a given area.

- **Land Developer Participation in Providing for Bus Transit Facilities/Operations (National Center for Transit Research at the Center for Urban Transportation Research, 2002)**

This report, developed by CUTR's National Center for Transit Research, documents various regulatory and non-regulatory strategies that Florida's local governments and transit agencies can use to generate public transportation funding. Funding would be generated through the involvement of private developers. Local and national case studies highlight some applications of these strategies that can be incorporated throughout Florida. The suggestions are designed for use within the framework of LGCPs, land development codes, and transit development plans, and therefore call for increased coordination and cooperation between local governments and transit agencies.

The 1999 legislative changes allowed local governments to use multimodal LOS measures; it also allowed impact fee assessments to be reduced if vehicle trips per household or vehicle miles traveled were reduced within the specified transportation district. Regulatory strategies include these LOS mechanisms (various applications of concurrency to contribute toward transit's capital and operational costs) and impact fees. They additionally include DRIs, trip reduction ordinances, and special financing districts (such as tax increment financing districts). Although these regulations are primarily applied for the benefit of local governments and transit agencies, there may be opportunities to extend them to statewide applications to SIS, TRIP, SHS, and FIHS facilities.

- **Model Ordinance for Proportionate Fair-Share Mitigation of Development Impacts on Transportation Corridors (Florida Department of Transportation/Center for Urban Transportation Research, 2006)**

This report drafts a model ordinance that local governments can use to implement proportionate fair-share mitigation within their jurisdiction. Implementation of such an ordinance is based on the prerequisite that the local governments must have a concurrency management system (CMS) in place. If a developer does not meet the transportation concurrency requirements of the permitting jurisdiction (with the exception of certain exclusions outlined in Florida statutes), they may pay a proportionate fair share toward the mitigation of a specific roadway facility or facilities impacted by the development. These roadway mitigations not only apply to roadways maintained by the local government, but also to facilities not maintained by them but will be subject to the impacts of the development. This would therefore include state transportation facilities within the jurisdiction of the permitting local government.

Within the model ordinance for proportionate fair-share mitigation are sections having direct applicability to FDOT-maintained facilities. Section G provides a basic application process for proportionate fair-share agreements. If the proposed mitigation would be on the Strategic Intermodal System (SIS), FDOT would be notified and invited to attend. The methodology for determining a developer's proportionate fair-share mitigation is based on the formula derived from impacts of DRIs:

“The cumulative number of trips from the proposed development expected to reach roadways during peak hours from the complete build out of a stage or phase being approved, divided by the change in the peak hour maximum service volume (MSV) of roadways resulting from construction of an improvement necessary to maintain the adopted LOS, multiplied by the construction cost, at the time of developer payment, of the improvement necessary to maintain the adopted LOS.”

OR

$$\text{Proportionate Fair-Share} = \sum \left[\left[\frac{(\text{Development Trips}_i)}{(\text{SV Increase}_i)} \right] \times \text{Cost}_i \right]$$

- **Model Regulations and Plan Amendments for Multimodal Transportation District (National Center for Transit Research at the Center for Urban Transportation Research, 2004)**

The report was prepared as a companion to the *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (FDOT 2004). Multimodal transportation districts (MMTDs) are to be carried out through local comprehensive plans, land development regulations, and capital improvements programs. This report provides model comprehensive plan amendments and model regulations for multimodal transportation districts to assist local governments in Florida. It is based on a national review of multimodal policies, ordinances, and practices at the local level and a synthesis of best practices. The report begins with an overview of the purpose and statutory requirements for multimodal transportation districts in Florida, and continues with model comprehensive plan amendments and land development regulations to assist local governments in implementing MMTDs.

- **Multimodal Transportation Districts and Areawide Quality of Service Handbook (Florida Department of Transportation, 2004)**

The Florida Department of Transportation has developed a *Multimodal Transportation Districts and Areawide Quality of Service Handbook* (FDOT 2004) to provide guidance on the designation and

planning of MMTDs as provided in Florida's growth management legislation. The handbook provides for MMTD designation in a downtown or urban core area, regional activity center, or traditional town or village in accordance with certain criteria. In these areas, planning efforts would focus on enhancing multimodal elements, guiding redevelopment, and encouraging appropriate infill. An MMTD could also be applied to a new or emerging area, where adopted plans and regulations would need to ensure the internal and external connectivity, a mix of uses, densities, and urban design features necessary to support alternative modes of transportation. The Handbook includes a checklist, Multimodal Transportation Checklist, which provides the minimum indicators for designation.

- **NCHRP Project 03-70: Multimodal Level of Service Analysis for Urban Streets [In Progress] (Transportation Research Board, estimated completion date: 2008)**

The Transportation Research Board is contracting services to investigate a method for multimodal traffic analysis for urban streets. The need for the evaluation of multimodal levels of service came as a result of federal legislation, such as ISTEA and TEA-21, which call for more emphasis on integrating transit, bicycle, and pedestrian modes into transportation planning. FDOT is credited as having made strides in this area through its efforts in developing multimodal planning, analysis techniques, and software (see Transportation Research Record 1776, "Multimodal Level of Service Analysis at Planning Level" by M. Guttenplan et. al.) Although the project focuses on multimodal LOS, it will likely continue to use LOS established for automobiles and trucks. Objectives of this project include: determining and testing methods of assessing LOS for multiple modes, specifically with respect to how the modes interact with one another; validating the methods; and preparing a draft chapter outlining these methods and providing examples for inclusion in future editions of the Highway Capacity Manual.

- **Site Impact Handbook (Florida Department of Transportation, April 1997)**

(To access a complete version of the Handbook, please go to the FDOT Planning Pages website at: <http://www.dot.state.fl.us/Planning/systems/sm/siteimp/PDFs/site.pdf>)

The Site Impact Handbook (Handbook) prepared by the Florida Department of Transportation (Department or FDOT) "was prepared (1) to address mandatory analysis and review requirements, (2) to offer guidance to all agencies on when the Department will be conducting these reviews, and (3) to identify how these reviews will be conducted, including which special practices (i.e., instructions) are applicable for each type of analysis or review."¹¹

The Handbook defines "site impact" as "any effort by the Department to prepare an analysis of or conduct review of an analysis prepared by another party to estimate and quantify the specific transportation-related impacts of a development proposal, regardless of who initiates the development proposal, on the surrounding transportation network. The Department's impact assessment may be limited to the State Highway System (SHS) or, as will be defined later, on any affected roadway system as determined by the procedures established in this Handbook and the specific type of review being conducted."¹²

The Site Impact Handbook includes the methodology employed by FDOT in reviewing the transportation impacts of various types of development proposals on the state highway system. The

¹¹ Site Impact handbook. Page1. *To access a complete version of the Handbook, please go to the FDOT Planning Pages website at:*

<http://www.dot.state.fl.us/Planning/systems/sm/siteimp/PDFs/site.pdf>

¹² Ibid.

Handbook includes detailed procedures, checklists, and criteria for evaluating the potential impacts of comprehensive plan amendments, DRIs, and any developments that request access to state highways. It includes guidance and thresholds for more or less detailed analysis for the following criteria:

1. Study Area Requirements: estimated using judgment, then refined. Specifically defined in Rule 9J-5 for DRIs as all roadways where project traffic is a minimum of 5% of the maximum service volume for the adopted LOS standard.
2. Analysis Years: include the existing and anticipated opening years of the development, build out of major phases in a multi-year development, long-range transportation plans or local government comprehensive plan (LGCP) horizons, and MPO transportation improvement program (TIP) horizons or other significant transportation network changes. Sophistication of the analysis should be reduced for projects with build outs beyond ten years.
3. Analysis Periods: are based on a peak-hour analysis and “should be related to known and anticipated peaking patterns of demand on the transportation system and development traffic,”¹³ typically the 100th highest hourly volume. Suggests ranges of periods to be considered including “the 100th highest hourly volume, 30th highest hourly volume (required for all design applications), weekend peak periods or other special event peaks.”¹⁴
4. LGCP and Concurrency: “Typically these developments occur in only one phase. Therefore, the existing and anticipated opening year of the development assuming build out and full occupancy is the only horizon year required.”¹⁵
5. DRI: The year of commencement (or opening of first phase of the development), the anticipated opening year of each major phase of the development assuming build out and full occupancy of each phase, and the termination year (or year of complete development assuming full occupancy) should be considered for all DRI type analyses. See FS 380.06 for additional guidance.¹⁶
6. Analysis Methods: Discusses the appropriate use of both manual methods and travel demand model forecasting methods (FSUTMS, etc.).
7. Data Collection:
 - a. transportation system data - per state and local sources such as MPO Long-Range Transportation Plan and Transportation Improvement Program, local comprehensive plans, other DRIs or development orders or development agreements, engineering and planning studies within the study area, local concurrency management system requirements, local land use zoning and design requirements;
 - b. transportation demand data - includes identification of current and historical traffic volumes, turning movement counts, and traffic characteristics;¹⁷
 - c. existing land use and demographic data - includes future land use classification, intensity, population, employment, comprehensive plan data and zoning requirements;¹⁸ if modeling is used, identify traffic analysis zone of proposed development and verify study area data including other committed developments - related vested developments within the preliminary area of influence, adopted amendments to the comprehensive plan or other development agreements.

¹³ P. 34.

¹⁴ P. 36.

¹⁵ P. 36.

¹⁶ P. 36.

¹⁷ P. 39.

¹⁸ P. 39.

8. Operational Analysis: perform using FDOT-approved software, FDOT LOS manual or the latest version of HCM.
 9. Background Traffic: includes several techniques for estimating background traffic, including manual methods, build-up methods, growth factor using related demographic characteristics, regression analysis techniques, and ZDATA interpolation.
 10. Trip Generation: per ITE's Trip Generation or FDOT TIPS software; pass-by trips: commonly determined using the FDOT TIPS program with the parameters as recommended in the Handbook or ITE recommended methodology. In most circumstances, the estimated pass-by trips calculated using the size of a proposed retail development should not exceed 10% of the adjacent-street traffic volume during the peak hour or 25% of the total trip generation. Internal capture: must be contained within on-site circulation systems only. A rate of 20 to 25 percent is considered very high for any mixed-use development.
 11. Trip Distribution: sets forth several manual methods and the modeling option from FSUTMS where data is found in the file DISTRIB.OUT. "The level of effort involved in this step is a function of the intensity and type of development proposed, adjacent land uses and the time of day being evaluated."¹⁹
 12. Mode Split: not considered to be a significant part of site impact analysis because most of the data related to site impact analysis are collected at suburban locations and those locations rarely have alternatives to automobile transportation. The impact of transit share is usually less than five percent of the trips which are reduced from driveway trips. If the mode split is considered for site impact analysis for transit and other non automobile modes, the applicant must clearly document the mode split estimations and enter into an agreement with the transit agency for proposed usage.
 13. Trip Assignment: contains detailed procedures for both manual methods and model methods. The manual methods "should be made using the trip frequency, duration and direction (between zones) tables produced as part of the trip distribution."²⁰ Model methods are based on FSUTMS with the SELECTED ZONE ANALYSIS being the preferred tool. The product is "to provide a set of volumes and traffic characteristics appropriate for use in the analysis of traffic operating conditions."²¹(11-70) Other items addressed include AADT, planning hour volume, K100 factor, capacity restraint and K100 ranges, directional distribution factor, peak hour factor, design hour volumes, composition of traffic, and peak-hour factor.
 14. Future Condition Analysis: An analysis is performed to determine if the development traffic impacts are 1. significant and 2. adverse.
 15. Mitigation Analysis: Improvements may be required if the results of site impact analysis shows that a development's impacts reduces LOS under minimum desirable level. Mitigation strategies may involve provision of additional capacity by improving a facility or reducing the demand by decreasing the density or intensity of a development or phasing the construction.
- **Trip Generation, Internal Capture and Pass By Software (TIPS), Version 1.3.6 (Florida Department of Transportation, Systems Planning Office)**

Trip Generation, Internal Capture and Pass By Software (TIPS) was developed by the Florida Department of Transportation (Systems Planning Office) along with RS&H. This program is used to calculate trip generation, internal capture, and pass by trips for given land uses. Previously, these

¹⁹ P. 61.

²⁰ P. 67.

²¹ P. 70.

calculations were only able to be determined by manual application of the ITE Trip Generation Manuals. This could be very time consuming, especially because the Trip Generation Manuals consist of two large volumes of books, each early one thousand pages. TIPS makes this previously daunting task much simpler with its clear-cut, easy to use interface.

The TIPS software was developed from three sources: The Site Impact Handbook developed in 1997 by the Florida Department of Transportation, Trip Generation 7th Edition published by the Institute of Transportation Engineers, and the Trip Generation Handbook (2001) also published by the Institute of Transportation Engineers.

The software uses a basic three-step process. The initial step is to calculate the traffic generated by the proposed development. The second step, for mixed-use developments, is to adjust the traffic generation for internal capture (traffic that is internal to the development). The final step is to modify the traffic generation for pass-by traffic, traffic that is already on adjacent streets and diverts into the proposed development

One of the best features of TIPS is that it includes a graph of the raw data, along with tables containing the range in values of the data, the standard deviation, and the number of studies. This information is extremely useful because it allows the user to make judgments as to if the regression equation or average rate is appropriate to for each occurrence.

The program's internal trip analysis is based on the unconstrained internal capture rates from the ITE Trip Generation Handbook (March 2001). It is recommended that maximum internal capture rates be negotiated at a methodology meeting. A column to adjust the total percentage of trips eligible for internal capture is provided on the Internal Capture rate table.

This software was developed for use in traffic analysis by and for the Florida Department of Transportation (FDOT). The standards and practices identified in the FDOT Site Impact Handbook are an integral part of the software. In the event the Site Impact Handbook is silent on a particular issue, and the Institute of Transportation Engineers (ITE) recommends a practice or analytical technique, the ITE practice be used.

The TIPS software was designed to be a very flexible tool in estimating the traffic generated by development projects. The software has a preferred methodology, however, it can be easily modified by the analyst. These modifications are identified by the software and in the output by a blue color in the modified cells and by marking the rows that were modified. This permits the reviewer to identify parts of the traffic generation process that were changed by the analyst.

The one item lacking from TIPS, which is included in the Trip Generation Manual, is the definition for each of the land-uses. This is very important because many times the title of the land-use used by TIPS/Trip Generation Manual can be deceiving. It is therefore always a good idea to check the land-use definition against the land-use proposed to be built.

- **Options for Making Concurrency More Multimodal: Response to SHB 1565, 2005 Session (Mark E. Hallenbeck, Dan Carlson, Keith Ganey, Anne Vernez Moudon, Luc de Montigny, and Ruth Steiner, December 2006)**

This report explores alternatives to implementing current concurrency practices in the State of Washington. Presently, concurrency is analyzed at the local level and viewed with respect to automobile impacts. In addition, it fails consider regional impacts except when local road are affected.

The proposed alternative would be to apply a two-tiered approach to transportation concurrency. The first tier—evaluating local impacts—would use a multimodal method of identifying key facilities (existing or not) needed in the area being served by the adopted concurrency system. More developed areas would base concurrency on the operational performance of the street system, while less dense areas would combine the need for a planned grid network, traditional LOS calculations, and park-and-ride availability. The second tier—development of a regional concurrency system—would allow a regional authority to give incentives or disincentives to developers locating to areas most effectively and efficiently served by public transportation facilities. Each region would be entitled to develop a definition of regional concurrency. However, they would not have authority to make land development decisions. Instead, it is strongly recommended that regional authorities be given some authority over transportation funding for their region.

- **Practitioner’s Handbook. From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making (TCRP Report 106/NCHRP Report 536, 2005)**

This handbook was developed to provide practical advice on establishing and maintaining collaborative relationships for multimodal decision making. It provides a method for evaluating the health of an existing collaboration, as well as guidance in creating a multi-step strategy for new or refined collaborations. Case studies were derived from diverse transportation planning and policy areas to produce a product to assist various governments and agencies. FDOT District staff should find this information useful as they work together with local and regional agencies to maintain mobility on state transportation systems.

- **Working with Proportionate Fair-Share (Florida Department of Transportation, December 2006)**

FDOT’s guide, “Working with Proportionate Fair-Share,” was developed to provide District staff with a detailed overview of how proportionate fair-share works and should be applied according to its intended design. The guide describes the concept of proportionate fair-share (in contrast to proportionate share; which applies specifically to DRIs), how it is calculated; its implementation at the District level for FDOT facilities; which plans, roadway types, and phases can benefit from proportionate fair-share contributions; and key proportionate fair-share agreement components.

The guide does not directly address methods of improving a state facility’s performance by monitoring its level of service. Rather, it is more directed in how proportionate fair-share mitigations can be used by FDOT Districts toward state facilities that will be impacted by local development. It also provides guidance on how the mitigations can be coordinated with the Work Program to ensure that funding will be available for capital projects needed to fulfill concurrency requirements. Developers can enter into fair-share agreements with FDOT as they relate to SIS or SHS facilities, although they are not required by law. These agreements will assure FDOT that funding will be available for Work Programs or Plans only if concurrency for the facilities can be met within the specified timeframes.

- **Working with Transportation Concurrency Exception Areas (Florida Department of Transportation, September 2006)**

FDOT’s guide, “Working with Transportation Concurrency Exception Areas,” was developed to provide District personnel with a guide to coordinate with local governments in reviewing plans to establish and maintain a Transportation Concurrency Exception Area (TCEA). The guide provides staff with very general overviews of concurrency and its various implementations (which includes a

TCEA); the reason for creating a TCEA; application of TCEAs to development goals; requirements to designate a TCEA; financial feasibility and funding; and a TCEA review checklist.

The guide primarily describes requirements that local governments “must” or “should” meet in order to designate a TCEA in a “frequently asked questions” style. This provides formative boundaries that an FDOT District staff can work within when considering a submitted TCEA for approval. Limited guidance is given to reviewers (such as thresholds or examples of how to achieve certain criteria) on what a proposed area must achieve to be designated a TCEA.

A TCEA review checklist offers an outline that a reviewer can use to ensure an application meets consistency with local government comprehensive and mobility plans, as well as addressing potential impacts to the Strategic Intermodal System (SIS); however, the checklist stops short of discussing thresholds to verify that conditions of consistency have been adequately met. If the TCEA under review does not meet a condition, general guidance is given on how the TCEA should address that deficiency. While local governments must consult with FDOT regarding the establishment of a TCEA and coordinate with FDOT regarding its mobility plan, the FDOT’s authority in these matters is unclear.

- **Working with Transportation Concurrency Management Systems (Florida Department of Transportation, September 2006)**

FDOT’s guide, “Working with Transportation Concurrency Management Systems,” was developed to provide District personnel with a guide to coordinate with local governments in reviewing plans to establish and maintain a transportation concurrency management system. The guide provides staff with a general overview of concurrency and its various methods of implementation.

The guide provides a general overview of key items that reviewers should consider when evaluating a CMS application. Included in the overview is a section that lists general CMS requirements. However, the overview does not direct reviewers on how to ensure that all aspects of a CMS are adequately addressed by a local government leaving FDOT’s authority subject to interpretation.

APPENDIX B: INTERVIEW GUIDE

The purpose of this interview is to identify issues and practices in the review of transportation site impact assessments and level of service analysis for concurrency, comprehensive plan amendments, and developments of regional impact (DRIs), especially with regard to impacts to the Strategic Intermodal System (SIS) and facilities funded through the Transportation Regional Incentive Program (TRIP). It is also aimed at identifying emerging issues and practices regarding mitigation of transportation impacts, particularly in light of the new proportionate fair-share mitigation process and the increased role of FDOT in monitoring impacts to the SIS and TRIP under the 2005 growth management legislation.

Process and Methodology Issues and Applications

1. Describe the process you are using in the evaluation of level of service (LOS) for transportation site impact analysis.
 - a. What, if any, issues are you are experiencing with this process?
 - b. (For FDOT only) Are growth management issues (comprehensive plan amendments and DRI's) handled by the LOS Coordinator or another person(S) in your District?
2. What are your requirements for future traffic forecasting? (model v. historic trends)
3. What are your requirements for existing traffic volumes?
 - a. Are reserved trips (previously approved trips) specifically included in each traffic analysis?
 - b. Do you require applicants to account for traffic from development approved and vested prior to concurrency?
4. Describe how the various tools are used to determine level of service from a preliminary determination to a detailed analysis. Address use of both generalized tables and analytical software (LOSPLAN vs. HCS, and Synchro). Identify any traffic simulation software such as CORSIM and SimTraffic used as a supplemental tool for confirmation of the result from a detailed analysis.
 - a. Have you established specific parameters for software applications?
 - b. If yes, provide the parameters for each type of software used.

FDOT Consultation and Mitigation

5. Describe your consultations with local governments regarding proposed transportation concurrency exception areas (TCEAs), transportation concurrency management areas (TCMAs), multimodal transportation districts (MMTDs) and related plans to mitigate impacts on SIS and TRIP facilities.
 - a. What, if any, issues are you experiencing with this process?
6. Describe the process you use for mitigating development impacts on SIS and TRIP facilities.
 - a. What, if any, issues are you experiencing with this process?
7. Have you accepted off-system improvements as mitigation (e.g., parallel relievers, street network connections, service roads, etc.)?

- a. If so, how do you evaluate these proposals to determine whether they will adequately alleviate impacts?
 - b. Is such mitigation part of a long-term corridor management plan?
8. Have you accepted transit or other multi-modal strategies (i.e., transportation demand management or non-motorized transportation) as mitigation?
 - a. If so, how do you evaluate these proposals to determine whether they will adequately alleviate impacts?
 - b. If your agency or District does not currently use non-roadway mitigation strategies to improve LOS, under what circumstances would you consider it?
9. Describe methods you have used to require and collect monetary contributions from developers to mitigate traffic impacts? (proportionate fair-share mitigation, impact fees, etc.)
 - a. How was the money used? (e.g., roadway improvements, transit, TDM, etc.)
 - b. How do you convey your “concurrence” of proposed mitigation when using proportionate fair-share mitigation pursuant to SB 360?
10. What major challenges are you facing to improve mobility on SIS, TRIP, and other facilities? How might you address those challenges?

Thank you for participating in this study!

PART II - TECHNICAL MEMORANDUM 2

ABOUT THIS GUIDE

The desire to maintain mobility on Florida’s transportation system is universal; however, deciding who or what entity is ultimately responsible remains elusive. One thing is clear – all agencies involved with development approval or transportation service provision must work together. This guide includes tools, resources, and guidance to enable transportation partners to respond effectively to growth management issues, to become more proactive, and to maximize use of limited transportation funds. These transportation partners may include among others local governments, metropolitan planning organizations (MPO), regional planning councils (RPC), and the Florida Departments of Transportation (FDOT) and Community Affairs (DCA). It also offers examples of what may be considered acceptable mitigation of transportation impacts to transportation facilities that are part of the Strategic Intermodal System (SIS) or Florida Intrastate Highway System (FIHS), or are funded through the Transportation Regional Incentive Program (TRIP). Throughout this guide, items noted as a “Resource” are available for download.

Resources:

1	<i>Transportation Concurrency: Best Practices Guide</i>
2	<i>Working with Transportation Concurrency Management Systems</i>
3	<i>Guidelines and Questions for Transportation Monitoring and Modeling Studies</i>
4	<i>Guidelines and Performance Measures to Incorporate Transit and Other Multimodal Strategies into the Development of Regional Impact Review Process</i>
5	<i>Level of Service (LOS) Variance Request for Interstate 4 and US Highway 27</i>
6	<i>Transportation Proportionate Share Agreement</i>
7	<i>Working with Transportation Concurrency Exception Areas</i>
8	<i>A Guide for the Creation and Evaluation of Transportation Concurrency Exception Areas</i>
9	<i>Multimodal Transportation Districts and Areawide Quality of Service Handbook</i>
10	<i>Model Regulations and Plan Amendments for Multimodal Transportation Districts</i>
11	<i>Okeechobee Boulevard CRALLS Point System</i>
12	<i>Incorporating TDM into the Land Development Process</i>
13	<i>Guide for Analysis of Corridor Management Policies</i>
14	<i>Corridor Preservation Best Practices for Local Governments</i>
15	<i>Access Management Model Plan Amendment</i>
16	<i>Access Management Model Ordinance</i>
17	<i>Managing Corridor Development</i>
18	<i>Accomplishing Alternative Access on Major Transportation Corridors</i>
19	<i>Second Edition of the Transit Capacity and Quality of Service Manual (TCQSM)</i>
20	<i>Land Developer Participation in Providing for Bus Transit Facilities/Operations</i>
21	<i>Comprehensive Transportation Review Methodology (CTR)</i>
22	<i>Working with Proportionate Fair Share</i>
23	<i>Model Ordinance for Proportionate Fair-Share Mitigation of Development Impacts on Transportation Corridors</i>
24	<i>Alternative Funding Strategies for Improving Transportation Facilities: A Review of Public Private Partnerships and Regulatory Methods</i>
25	<i>From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision-Making</i>
26	<i>Impact of Employer-Based Programs on Transit System Ridership and Transportation System Performance</i>

DOCUMENTING IMPROVED MOBILITY TECHNIQUES ON SIS AND TRIP FACILITIES
PART II - TECHNICAL MEMORANDUM 2
ABOUT THIS GUIDE

I. GROWTH MANAGEMENT AND SITE IMPACT PROCESSES

FDOT staff review a variety of transportation or traffic impact analyses addressing the impact of the proposed development on the State Highway System. Transportation impact analyses may address concurrency, comprehensive plan amendments, developments of regional impact (DRIs), or sub-DRI developments. In most cases, the transportation impact review process and methodology is driven by local governments with little uniformity across the state or even at the District level.

This section includes recommended practices to augment existing review processes for transportation concurrency, comprehensive plan amendments, developments of regional impact (DRI), DRI exemptions, sub-DRI development, and level of service variances.

A. Transportation Concurrency

It is the responsibility of local government to meet statutory requirements for concurrency; however, all transportation partners can benefit from an understanding of and participation in local government concurrency management systems (CMS). The following steps are recommended for transportation planners regardless of jurisdiction.

1. ***Understand the basics of concurrency management systems.*** Although each local government concurrency management system may work a little differently, the basic concepts of such systems are similar. *Transportation Concurrency: Best Practices Guide (Resource 1)*,²² presents practical guidance regarding local government concurrency management systems including an overview of the concurrency review process and considerations for establishing level of service standards, applying concurrency alternatives (i.e., transportation concurrency exception areas (TCEAs), etc.), developing a concurrency management system, and evaluating the transportation impacts of comprehensive plan amendments. It also offers a detailed look at the process for implementing transportation concurrency and the mechanics of a concurrency tracking system. The guide includes a sample transportation impact methodology for reviewing comprehensive plan amendments and projects with impacts that cross jurisdictional boundaries.

Polk County has a county-wide concurrency management system that also tracks major roadways within municipalities. This is accomplished through interlocal agreements.

To encourage coordination, FDOT has provided District personnel with the guide, *Working with Transportation Concurrency Management Systems (Resource 2)*,²³ to assist local governments as they implement transportation concurrency management systems. The guide presents a general overview of concurrency, CMS uses, and requirements to establish a CMS.

2. ***Become familiar with local government concurrency management systems in the area.*** Because each CMS is different, it is important to become familiar with each system. A familiarity of each CMS within a geographic area will enable practitioners to use the systems as a tool for transportation planning purposes. Generally, each local government has one or more staff assigned to managing the transportation CMS who will be able to explain the details of the

²² *Transportation Concurrency: Best Practices Guide*. Florida Department of Community Affairs, September 2007.

²³ *Working with Transportation Concurrency Management Systems (CMS)*, Florida Department of Transportation, 2006.

system and serve as a regular contact. Local CMSs should identify when proposed projects will impact the State Highway System.

3. ***Establish an annual (or more frequent) “State of the System Review” for SIS, FIHS and TRIP facilities.*** Transportation professionals are encouraged to compare the current level of service (LOS) as determined by the FDOT with the LOS established in the local government CMS for specific roadways. Any differences in the level of service or maximum service volume used for the analysis should be carefully reviewed by both parties. The ultimate goal of this review is to achieve a consensus on existing LOS and future LOS of these facilities based on existing traffic, anticipated traffic growth, and trips approved by local government. Guidance for performing a “State of the System Review” is found in Attachment I-A.

All Districts annually estimate the level of service for each of their state roads. This information is used as a guide when reviewing transportation impact analyses. Generally, a review begins with a sketch planning analysis performed using the FDOT Generalized Tables to screen for deficiencies. A more detailed analysis may be required on facilities where anticipated traffic volumes (background plus development traffic) exceed a percent of the maximum service volume (e.g., 85 percent) for the adopted LOS standard as established in the Generalized Tables.

B. Comprehensive Plan Amendment Review

Amendments to local government comprehensive plans, particularly the future land use map, typically involve an increase in the density or intensity of use. It is important to gauge the impacts of those proposed land use changes on the transportation system as well. This is not for the purpose of concurrency review, per se, rather, analyzing these impacts provides the local government with advance warning of the need to increase transportation system capacity or reduce demand on the system to accommodate future land use changes as well as to comply with Florida growth management law.

When a transportation need resulting from a proposed future land use map change is identified, corresponding capacity improvements or other mitigation strategies must be included in the transportation element and the capital improvements element during the same amendment cycle. This will ensure that the necessary transportation facilities or services will be available when development authorized by the amendment is ultimately permitted. Planned transportation system improvements can also form the basis for proportionate fair-share mitigation (per Section 163.3180(16) F.S.).

Local governments or their consultants send proposed comprehensive plan amendments directly to DCA, FDOT, and other review agencies. Proposed amendments usually contain a broad transportation analysis of impacts to the transportation system. DCA establishes the schedule for review via an email to review agencies. FDOT staff analyze the potential for impacts to SIS, FIHS, or TRIP-funded facilities that may result from the proposed change in land use category.

Local governments often submit numerous future land use map amendments in a given amendment cycle. Although each applicant may be required to prepare a transportation impact analysis of the proposed land use change, the cumulative impacts of all amendments in a cycle are typically not analyzed. Failure to analyze cumulative impacts can result in inadequate planning for future transportation system needs and improvements. It is, therefore, a good idea for each local government to consider the cumulative impacts of proposed comprehensive plan amendments. Such an approach is outlined in *Transportation Concurrency: Best Practices Guide* ([Resource 1](#)).

A standardized comprehensive plan review process and schedule among a local government, FDOT, and DCA may enhance communication and coordination of CPA review as well as mitigation of

impacts. An approach to such a review process is outlined in Attachment I-B. During this process, all parties should ensure that improvements required to accommodate proposed future land use map (FLUM) changes are identified in the local government transportation or traffic circulation element and the capital improvement element. These elements should also accurately reflect any improvements found in the MPOs long range transportation plan (LRTP) transportation improvement program (TIP), and Transit Development Plan (TDP).

C. Developments of Regional Impact

A development of regional impact (DRI) is subject to a review process during which the regional planning council, the state, and other affected agencies have an opportunity to comment on the impacts of a proposed development. The primary purpose of the DRI review process is to provide the opportunity for multiple agencies to participate in identifying and addressing development impacts that cross jurisdictional boundaries, including impacts to the regional transportation system.

FDOT's role in the DRI review process is primarily to review the impact of a proposed development upon the State Highway System, particularly the Strategic Intermodal System (SIS). Reviews are conducted by the FDOT in accordance with FDOT's Site Impact Handbook (1997). FDOT's role in the DRI review process includes:

- participation in the DRI traffic impact methodology meeting between the applicant and reviewing agencies;
- review of applications for development approval (ADA) and notices of proposed changes (NOPC) along with concurrent proposed amendments to the local government comprehensive plan (LGCP); and
- provision of comments and recommendations to the RPC.

The applicable regional planning council (RPC) is charged with coordinating the review process. Rule 29, F.A.C. outlines general RPC practices and procedures for the DRI review process; however, some RPCs have adopted additional administrative procedures. Among other issues, procedures address the process of DRI review and monitoring, fees, number of copies to be submitted, and procedures for the pre-application conference. Local governments and FDOT Districts should work with regional planning councils to establish uniform method(s) for determining mitigation requirements for impacts to SIS, FIHS, and TRIP-funded facilities. This document is intended to aid in this process.

Participation in the pre-application conference and traffic impact methodology meeting is essential so that all parties may reach agreement on methodology details. Per the East Central Florida Regional Planning Council (ECFRPC), at a minimum the following must be addressed at this meeting:

- study area roadways and intersections to be analyzed;
- minimum acceptable LOS;
- service volumes to be used;
- improvements to be assumed as constructed in the future analysis year;
- trip generation methodology;
- significance levels; and
- use of modeling or any revisions to an adopted FSUTMS²⁴ model.

²⁴ Florida Standard Urban Transportation Model Structure. A new modeling engine has been adopted for FSUTMS, known as Cube Voyager. The new program is a Windows-based and more user-friendly than the DOS-based operating system of FSUTMS.

The wording of development order conditions varies among RPCs producing dramatically different results. In some cases, conditions require very little from the developer; however, in other cases, conditions net essential funding for mitigation of the DRI's impact on the transportation system. Mitigation dollars required through development order conditions from multi-use DRIs in FDOT District 2 which includes the Jacksonville metropolitan area ranged from \$280 to \$1,518 per new daily trip (from 2002 to 2006). This has netted millions of dollars toward capacity improvements in the District. The mitigation may be in the form of land, money, or construction of the necessary improvement. Cash payments for mitigation are usually processed by the local government. Funds appropriated for mitigation of impacts to the state highway system are coordinated between the local government and FDOT.

In *Guidelines and Questions for Transportation Monitoring and Modeling Studies* (Resource 3),²⁵ the ECFRPC advocates the modeling and monitoring (M & M) schedule as a method of ensuring the traffic impacts to any regional roadway affected by a development of regional impact (DRI) do not fall below its adopted level of service. Although not required for the DRI review process, it may be included in a development order to satisfy a minimum condition to show that adequate provisions are made for public transportation facilities and maintenance of LOS at the end of each project phase or phase subset (Rule 9J-2.045(7)(a), F.A.C.). Currently, only District 5 is known to incorporate the M & M schedule into their DRI review process.

An M & M schedule must identify the actions or measures necessary to mitigate significant and adverse impacts to the transportation system in order to proceed to the next phase of a project's development. It must also identify the amount of development that will adversely impact the roadway, as well as when the impacts are scheduled to be mitigated subsequent to each phase or phase subset of a project. If roadway improvements together with timing of such improvements are not identified in the M & M schedule, building permits will be withheld for that project phase or subset until written approval is obtained and compliance with any needed roadway improvements can be demonstrated.

A study period consisting of the next stage of development, and traffic study for the existing peak hour LOS and projection of the next phase's LOS for all impacted roadways listed on the M & M schedule help exhibit compliance with the development order. The study must include estimated traffic for all background developments and the project during the next study period, as well as the end-of-study-period LOS for the impacted roadways. The project traffic is to include all existing project developments, permitted project developments, and project developments anticipated to receive building permits during the next study period.

Regardless of the jurisdiction, DRI proposals and subsequent development orders rely mainly on roadway improvements as mitigation for transportation impacts and include little in the way of providing multimodal solutions. *Guidelines and Performance Measures to Incorporate Transit and Other Multimodal Strategies into the Development of Regional Impact Review Process* (Resource 4)²⁶ encourages FDOT's collaboration with transit agencies and regional planning councils (RPC) in their review of developments of regional impact, and, specifically, the inclusion of transit, bicycle, and pedestrian facilities. The guidelines offer practices for incorporating transit into the DRI review process including information to share with the applicant early in the process, additional multimodal-related submittal requirements, sample sufficiency comments, sample development order conditions,

²⁵ *Guidelines and Questions for Transportation Monitoring and Modeling Studies*. East Central Florida Regional Planning Council. 2000.

²⁶ *Guidelines and Performance Measures to Incorporate Transit and Other Multimodal Strategies into the Development of Regional Impact Review Process*, Center for Urban Transportation Research/USF, Florida Department of Transportation, pending 2007.

and review checklists. Transportation partners can use these guidelines to focus transportation impact mitigation strategies on alternative modes of transportation in DRIs and other development.

D. Sub-DRI Development and DRI Exemptions

Many of the trips that impact SIS, FIHS, and TRIP-funded facilities are approved by local governments outside of review processes that include FDOT. This may include trips that are generated by sub-DRI development, that is, any size of development below DRI review thresholds,²⁷ and developments considered to be exempt from DRI review per relevant Florida statutes or DRI exemptions. Communication and coordination between FDOT District staff and local government is key to mitigating impacts of these types of development. Districts should request notification regarding major development proposals that will impact a state highway and local governments should regularly share development information with FDOT.

Often, FDOT only becomes aware of sub-DRI development when a developer requests an access permit. In some Districts, access permitting personnel alert the District site impact coordinator when they believe a project seeking an access permit will have a significant, and adverse, impact on the State Highway System. Traffic studies for access permitting focus on the safety and operation of the transportation system near the proposed development, not on issues of major long term improvements to the transportation system away from the development site. Hopefully, at the time of access permitting, the local government has already dealt with the issues of concurrency and long term improvements to handle the expected traffic from this development. At the access permitting phase, it is too late to start the process of growth management concurrency evaluation. It is the responsibility of the local government with land use jurisdiction to ensure an applicant complies with concurrency requirements before the permitting phase.

Regular development review meetings between local governments and FDOT create the opportunity to coordinate on technical issues, to identify impacts to SIS, FIHS, and TRIP-funded facilities, and to develop mitigation strategies for facilities at or near deficiency. These mitigation strategies can then be used as a basis for proportionate fair-share mitigation. In addition, review of comprehensive plan amendments and their potential for adverse impacts to the transportation system should also be addressed with local government as these amendments are likely to become sub-DRI development.

The 2005 growth management legislation established new statutory exemptions from the DRI requirements. These DRI exemptions include proposed developments that lie within designated urban service boundary areas, rural land stewardship areas, or urban infill and redevelopment areas and where the local government having jurisdiction has entered into a binding agreement regarding the mitigation of impacts on state and regional transportation facilitates with adjacent jurisdictions and FDOT, and adopted a proportionate fair-share mitigation program.

The *Transportation Concurrency: Best Practices Guide* ([Resource 1](#)) includes a recommended practice for assessing and mitigating transportation impacts of DRI's that have been exempted from the standard DRI review. It also has an agency coordination procedure. The procedure is offered in recognition of the need for a formal process in which local governments could both inform and coordinate with neighboring jurisdictions and FDOT regarding the transportation impacts of a proposed development, particularly a DRI exemption, at or near another jurisdiction's border.

²⁷ Information regarding DRI thresholds according to county is available at <http://www.dca.state.fl.us/fdcp/dcp/procedures/index.cfm>

E. Level of Service Variance

In a limited number of cases, it may be appropriate for FDOT to consider granting a variance to Rule 14-94, F.A.C. which establishes LOS standards for SIS, SIS connectors, or TRIP-funded facilities in accordance with Section 120.542, Florida Statutes. A level of service variance is considered only as a temporary mechanism to allow a designated facility to fall below the LOS standard for an established time period while the jurisdiction implements long term plans to remedy a LOS deficiency.

Early coordination with the appropriate District is essential to a successful variance request. District staff will explain the process and offer acceptable examples of a LOS variance. *Level of Service (LOS) Variance Request for Interstate 4 and US Highway 27* ([Resource 5](#)) is provided as one excellent example of a LOS variance request. Such variance requests from jurisdictions responsible for concurrency will be considered in conjunction with long-term concurrency management systems where designated facilities will meet required LOS standards over time.

Prior to filing a variance request, the applicant should work closely with the District to develop suitable mitigation plans and strategies. If the Department determines that a request for variance should be granted, it will issue an “Order Granting Petition for Variance.” Level of service variance requests containing acceptable justification for level of service deficiencies and appropriate mitigation may be eligible for expedited review procedures.

Attachment I-A - Performing a State of the System Review

Purpose

It is in the interest of local governments, metropolitan planning organizations, and FDOT to support mobility and avoid congestion as well as to recognize that transportation facilities and impacts on those facilities do not end at jurisdictional boundaries. Agencies must look beyond road widening improvements (e.g., examine bicycle, pedestrian, transit, transportation demand management, and traffic operations improvements) to accomplish mobility, particularly where needs outstrip funding or where such improvements are seen as adversely impacting community character.

This optional System Review is an example procedure for comparing the current level of service as determined by FDOT with the LOS as determined by the local government concurrency management system (CMS) on facilities that are on SIS, FIHS, and TRIP-funded facilities. Implementation of a System Review may be limited by District resources; however, the proactive effort may increase coordination efforts to minimize impacts to these facilities. In addition, although the first System Review may be challenging, future System Reviews would be facilitated by greater District and local government staff familiarity with the process and data requirements. Consensus on existing LOS and future LOS based on anticipated traffic growth, approved development trips, and adopted LOS standards forms the basis for achieving and maintaining mobility on SIS, FIHS, and TRIP-funded facilities.

Step 1: Set meeting date

- A. It is recommended that FDOT District staff initiate a meeting with all local governments that SIS, FIHS, or TRIP-funded facilities pass through or near. A representative from the area transit agency, MPO, commuter assistance program, and bicycle/pedestrian program should also be invited, where facilities pass through or near urban planning boundaries. For convenience, this may include several local governments at once and may be particularly beneficial where LOS standards are inconsistent on facilities that cross jurisdictional boundaries (Guidelines for addressing this issue can be found in *Transportation Concurrency: Best Practices Guide (Resource 1)*).
- B. Establish a date, time, and location for the meeting that is convenient for all participants.
- C. FDOT should prepare a list of applicable SIS, FIHS, and TRIP-funded facilities to be discussed during the meeting.

Step 2: Prepare information for meeting

- A. Each participating local government should prepare for the meeting by assembling applicable automobile and multimodal information for each road segment (SIS, SIS connectors, FIHS, and TRIP-funded facilities) from their CMS including:
 - (1) Facility name – the name of the road;
 - (2) From/To – the limits of the segment;
 - (3) Area type – urban, transitioning, or rural;
 - (4) Functional classification – according to FHWA Functional Classification Guidelines;
 - (5) LOS standard and maximum service volume (MSV) – the adopted LOS standard for that segment of road and maximum service volume;

- (6) FDOT LOS standard and MSV – the LOS standard per the FDOT 2002 Q/LOS Handbook and 2007 LOS Issue Papers (2002 Q/LOS Handbook Addendum); maximum service volume (as updated on http://www.dot.state.fl.us/planning/systems/sm/los/los_sw2.htm);
- (7) Jurisdiction – the local government establishing the LOS standard for the segment;
- (8) In average annual daily traffic (AADT) and p.m. peak hour traffic
 - (a) Existing traffic volume
 - (b) Projected traffic growth
 - (c) Approved traffic volume
- (9) Current level of service; and
- (10) Planned improvements (per financially feasible capital improvements element FDOT working MPO TIP and associated MSVs;
 - (a) Planned service enhancements (per Transit Development Plan), and
 - (b) Corridor-specific management plans and regulations (i.e., service road ordinances, transit-oriented development plans/regulations, right-of-way preservation requirements, street network and connectivity regulations, inter-parcel cross access requirements).

Step 3: Meeting format

- A. FDOT and local governments should then meet to perform the following for the identified facilities addressing LOS for all modes:
- (1) Verify existing traffic volumes and projected traffic growth;
 - (2) Verify approved development trips - in particular, examine volumes and multimodal services on facilities that cross jurisdictional boundaries to ensure they make sense based on permitting conditions;
 - (3) Verify maximum service volumes, particularly where local governments may have adopted service volumes other than those in FDOT's Generalized Tables (Note: Where local governments have adopted their own LOS standard and accompanying MSV on state roads; it is important for FDOT District staff to be aware of this situation and provide technical assistance if appropriate);
 - (4) Identify all transportation facilities where existing traffic volume plus projected traffic growth plus approved traffic exceeds 85 percent of the MSV associated with the adopted LOS standard for daily or peak hour traffic;
 - (5) Estimate the year when additional capacity will be needed;
 - (6) Review improvement projects, transit service, transportation demand management, pedestrian and bicycle enhancements scheduled in the capital improvement element (CIE) to determine if additional capacity is programmed (may be roadway capacity or other multimodal improvement);
 - (7) Identify opportunities to better coordinate mobility improvements with planned development on the corridors (i.e., transit service enhancements with transit-oriented development (TOD) locations, avoiding development within planned ROW, etc.);
 - (8) Develop a mobility plan designed to accommodate future traffic on the impacted corridors based on solutions other than adding lanes to existing roads, particularly if no improvement projects are programmed on deficient facilities.

Step 4: Adopt and implement mobility plan

- A. Each local government should incorporate the necessary policies to implement the mobility plan into their comprehensive plan, land development regulations, and concurrency management system (CMS) as appropriate.
- B. All parties responsible for implementing the mobility plan(s) should enter into an interlocal agreement to solidify their support of the plan and to identify their relative roles and responsibilities for implementing the plan.
- C. Adopt a schedule of short range and long range improvements and actions as part of the mobility plan.

DOCUMENTING IMPROVED MOBILITY TECHNIQUES ON SIS AND TRIP FACILITIES
PART II - TECHNICAL MEMORANDUM 2
ATTACHMENT I-A - PERFORMING A STATE OF THE SYSTEM REVIEW

Attachment I-B - Comprehensive Plan Review Process and Schedule

Local governments, DCA, and FDOT would benefit from establishing a standard comprehensive plan amendment (CPA) review process and schedule to ensure impacts to SIS, FIHS, and TRIP-funded facilities are adequately addressed through planning efforts. Notably this process encourages involving FDOT at an earlier stage to allow transportation concerns to be addressed prior to CPA transmittal. Below is a step-by-step process to achieve these goals:

Step 1. Identify CPA cycle dates

Local governments, FDOT, and DCA should mutually obtain and maintain a schedule of key dates for the two annual CPA cycles for each local government.

Step 2. CPA pre-application

Local governments may consider hosting a pre-application meeting for CPAs that may impact SIS, FIHS, or TRIP-funded facilities. In particular, such meetings will be useful in addressing complex issues regarding large-scale future land use map (FLUM) amendments, transportation concurrency exception areas (TCEAs), transportation concurrency management areas (TCMAs), and multimodal transportation districts (MMTDs). Invitees should include representatives from the local government initiating the plan amendment, metropolitan planning organization (MPO), FDOT, and the regional planning council (RPC).

Palm Beach County holds a comprehensive plan pre-application meeting for applicants. Review agencies such as FDOT are invited to attend.

Step 2a. Methodology

Transportation Concurrency: Best Practices Guide ([Resource 1](#)), includes a methodology for analyzing the traffic impact of comprehensive plan amendments. A recommended approach for addressing the cumulative impacts of CPAs is also included. Local governments may allow applicants to conduct a transportation impact analysis by subarea and/or corridor to identify cumulative impacts to SIS, FIHS, and TRIP-funded facilities. A cumulative analysis is best accomplished by aggregating or grouping proposed comprehensive plan amendments into specific geographic areas. These geographic areas may be sub-area, neighborhood, sector, or other planning areas, impact fee districts, transportation corridors, or specific traffic analysis zones.

Step 3. Initial CPA Review (optional)

Local governments may offer FDOT early review of the plan amendment agenda documentation package prepared by local staff for presentation before the designated local planning agency. This effort affords the local government an opportunity to address transportation system concerns early in the comprehensive plan amendment process. FDOT District staff will assess proposed CPAs for impacts to SIS, FIHS, and TRIP-funded facilities. Plan amendments of concern may include those located in close proximity to designated SIS facilities or other strategic transportation corridors and those in areas where transportation infrastructure is operating near or below adopted LOS with no supporting transportation facilities improvements programmed in the capital improvements element (CIE). FDOT will notify the local government of any concerns prior to the public hearing for transmittal of the plan amendments. This will give local government staff the opportunity to re-evaluate the transportation impact of proposed CPAs. In addition, District staff may appear at the public hearing (at the District Secretary's discretion) to place on record concerns the Department may have relating to a pending plan amendment.

Step 4. Final CPA Review

A copy of CPAs approved by the local government along with supporting documentation transmitted to DCA for review should also be sent directly by the local government to the FDOT District representative responsible for amendment reviews. DCA will determine the completeness of the plan amendment within 5 working days of receipt and notify the District if the package is complete. It is the responsibility of the local government to certify to DCA that copies of additional submissions have been sent to the FDOT District.

Within 10 days after receipt of amendment package, District staff will notify DCA which amendments they intend to submit review comments on and a list of preliminary concerns relating to the amendments. Plan amendments noted in the Initial Review should be included at a minimum unless changes were made to the proposed CPA that eliminate the concerns. DCA may request that the District perform a review on any amendment not included on the District's list. DCA will notify local government of its intention to conduct a review of the amendments listed by the District per §163.3184 (6) (b) F.S.

Within 30 days after receipt of an amendment package District staff will forward written comments to DCA regarding the respective plan amendment for potential inclusion into the subsequent Objections, Recommendations, and Comments ORC Report issued by DCA to the local government. Office of Policy Planning staff within FDOT Central Office as well as the applicable DCA reviewer should be contacted for any review containing a recommendation for "Objection" to facilitate communication and coordination.

FDOT staff review and comments should address the following:

1. Identify whether there is sufficient information to evaluate the impact of the proposed land use change on SIS, FIHS, and TRIP-funded facilities such as a transportation impact analysis. If not, request that an appropriate transportation impact analysis to be submitted for review
2. Identify flaws in the transportation impact analysis and recommend corrective action;
3. Identify the location of the proposed future land use amendment in proximity to the nearest SIS, FIHS, or TRIP-funded facility;
4. Verify the trip generation estimate of both the existing and future land use as well as the difference which is used for analysis;
5. Verify the adopted LOS standard (per Rule 19-94, F.A.C.) and the current level of service. Note where local government is using an incorrect LOS standard for SIS, FIHS, and TRIP-funded facilities;
6. If new trips will impact a deficient or near-capacity facility, ensure corresponding transportation system capacity improvement is in transportation and capital improvement elements (financially feasible);
7. If development (such as transit oriented development (TOD) or traditional neighborhood development (TND)) intends to rely on transit or other multimodal strategies, verify that adequate plans and programs are in place to support transit, transportation demand management, etc;
8. Include positive comments regarding the use of multimodal strategies, including,
 - recognize the transportation system benefits of TOD or TND; or
 - note the importance of access management.

II. STRATEGIES FOR MITIGATING TRANSPORTATION IMPACTS TO SIS, FIHS, AND TRIP FACILITIES

The 2005 growth management legislation increased the role of FDOT in the review of the transportation impacts of proposed developments on the SIS, the FIHS, and TRIP-funded roadways. In particular, the legislation required FDOT to concur with mitigation plans for those impacts as proposed by local governments. Local governments proposing new or applying existing transportation concurrency alternatives, transportation concurrency exception areas (TCEA), transportation concurrency management areas (TCMA), or multimodal transportation districts (MMTD), must consult with FDOT and DCA to assess potential impacts on SIS facilities. If impacts cause the facility to fall below the level of service required by Rule 14-94, F.A.C., plans must be cooperatively developed to mitigate those impacts.

The long term goal to maintain or improve mobility as measured by LOS on affected facilities is no small challenge. It requires application of a variety of techniques and strategies and, perhaps most importantly, increased and continuing intergovernmental collaboration. Level of service measures may move away from auto LOS as the primary measure for concurrency in favor of multimodal measures. Likewise mitigation strategies should include corridor management plans, supporting street network improvements, transportation demand management (TDM), increased transit service enhancements, and land use measures such as transit-oriented development (TOD), in addition to traditional roadway capacity improvements.

This section defines “concurrence,” discusses opportunities to develop mitigation plans, and provides a “menu of options” regarding mitigation strategies for transportation impacts. Such strategies will require the collaboration of transportation partners to develop and apply them.

A. Providing Concurrence for Mitigation Plans

The word “concur” commonly means to agree or work together. FDOT, local governments, and other transportation partners must work together to develop effective mitigation plans for impacts to SIS, FIHS, and TRIP-funded facilities and improve mobility. An appropriate mechanism to document agreement of such a plan is an interlocal agreement or memorandum of agreement. At a minimum, the agreement should identify the parties involved (e.g., FDOT, local government, developers), and responsibilities of all parties. To streamline approval of mitigation plans, an “umbrella” agreement may be developed and adopted by FDOT and specific local governments with individual addendums made for each mitigation plan. An example of this approach by District 3 and Walton County is included in *Transportation Proportionate Share Agreement* ([Resource 6](#)).

B. Opportunities to Develop Mitigation Plans

Section 163.3180, F.S., offers alternatives to strict adherence to transportation concurrency stating, “A local government may grant an exception from the concurrency requirement for transportation facilities if the proposed development is otherwise consistent with the adopted local government comprehensive plan and is a project that promotes public transportation or is located within an area designated in the comprehensive plan for: 1. urban infill development, 2. urban redevelopment, downtown revitalization, or 3. urban infill and redevelopment unders.163.2715.”

Alternative transportation concurrency areas include the transportation concurrency exception area (TCEA), the transportation concurrency management area (TCMA), the multimodal transportation

district (MMTD), and the long-term concurrency management system (long-term CMS). These alternative approaches may be used to mitigate transportation impacts to SIS, FIHS, and TRIP-funded facilities while accomplishing local planning objectives such as encouraging urban infill and redevelopment, emphasizing use of alternative modes of transportation, or addressing constrained facilities and concurrency deficiencies. Use of these mechanisms requires a comprehensive plan amendment and the approval of DCA, as well as concurrence from the FDOT if the facility is governed by Rule 14-94, F.A.C. Transportation partners should take full advantage of these established alternatives and apply them when appropriate.

(1) Transportation Concurrency Exception Areas (TCEAs)

The transportation concurrency exception area is the most widely used of available alternatives. It allows local governments to reduce barriers to infill and redevelopment, and the incentive for urban sprawl, by allowing development to proceed notwithstanding a failure to meet transportation concurrency. There must be a community commitment to pursue alternative modes of transportation and urban forms that will reduce single occupant vehicle trips.

The 2005 growth management legislation requires local government comprehensive plans to support and fund mobility strategies that promote the purpose of the concurrency exception. These strategies must address urban design, land use mix, and network connectivity within the TCEA. Local governments must justify the size of the TCEA. In addition, the legislation requires them to consult with FDOT and DCA prior to the designation of TCEAs to assess any impact the proposed TCEA may have on the SIS, as well as to develop plans in cooperation with FDOT to mitigate any impact. FDOT has provided a copy of *Working with Transportation Concurrency Exception Areas* ([Resource 7](#))²⁸ to District staff. The document provides guidance on how to review and coordinate with local governments as they establish and maintain a TCEA. DCA, in conjunction with the University of Florida, conducted a review of existing TCEAs in Florida with respect to the requirements of the 2005 growth management legislation. Model evaluation criteria for TCEAs were developed and applied in three pilot communities to test their effectiveness. Study results are published in *A Guide for the Creation and Evaluation of Transportation Concurrency Exception Areas* ([Resource 8](#)).

(2) Transportation Concurrency Management Areas (TCMA)

The second alternative, a transportation concurrency management area, is also designed to promote infill development and redevelopment. A TCMA “must be a compact geographic area with an existing network of roads where multiple, viable alternative travel paths or modes are available for common trips” (Section 163.3180(7), F.S.). The TCMA allows an LOS standard to be applied areawide rather than on individual road segments. The areawide LOS is determined by averaging the LOS on similar facilities within the designated area serving common origins and destinations. This alternative approach to strict concurrency should be used with an abundance of caution only where it is truly viable for trips to use alternative facilities.

A TCMA must be designated within the local government’s comprehensive plan using data and analysis that support using an areawide LOS standard. The comprehensive plan must detail how urban infill development or redevelopment will be promoted and how mobility will be accomplished.

²⁸ *Transportation Concurrency Exception Areas (TCEAs)*, Florida Department of Transportation, September 2006.

(3) Multi-Modal Transportation Districts

A multimodal transportation district is an area where primary priority is placed on “assuring a safe, comfortable, and attractive pedestrian environment, with convenient interconnection to transit.”²⁹ Communities must incorporate design features that reduce vehicular usage while supporting an integrated multimodal transportation system. Common elements include the presence of mixed-use activity centers, connectivity of streets and land uses, transit-friendly design features, and accessibility to alternative modes of transportation.

The *Multimodal Transportation Districts and Areawide Quality of Service Handbook* ([Resource 9](#))³⁰ guides users regarding the designation and planning of MMTDs in accordance with Florida’s growth management legislation. The Areawide QOS Handbook allows MMTD designation in a downtown or urban core area, regional activity center, or traditional town or village in accordance with certain criteria. In these areas, planning efforts would focus on enhancing multimodal elements, guiding redevelopment, and encouraging appropriate infill. An MMTD could also be applied to a new or emerging area, where adopted plans and regulations would need to ensure the internal and external connectivity, a mix of uses, densities, and urban design features necessary to support alternative modes of transportation. The Multimodal Transportation Checklist in the QOS Handbook includes the minimum indicators for designation.

Model Regulations and Plan Amendments for Multimodal Transportation Districts ([Resource 10](#))³¹ was prepared as a companion to the QOS Handbook. Multimodal transportation districts (MMTDs) are to be carried out through local comprehensive plans, land development regulations, and capital improvements programs. This report provides model comprehensive plan amendments and model regulations for multimodal transportation districts to assist local governments in Florida.

(4) Long-term Concurrency Management Systems

Many local governments have existing transportation concurrency deficiencies that require special attention and longer time frames to overcome. In such cases, local governments may adopt a long-term transportation concurrency management system with a planning period of up to 10 years (Rule 9J-5.0055(4), F.A.C). This allows local governments time to prioritize and fund projects to reduce the backlog of transportation projects. For severe backlogs and under specific conditions a local government may request approval from the DCA for a planning period of up to 15 years.

To implement a long-term transportation concurrency management system, the local government comprehensive plan must designate in the comprehensive plan specific areas where significant backlogs presently exist. These areas must be delineated on an adopted comprehensive plan map and be consistent with other elements of the plan. The system must establish improvement priorities and be financially feasible based on currently available revenue sources to ensure that existing deficiencies are corrected within the planning period.

A long-term schedule of capital improvements must also be adopted that identifies improvements needed to correct existing deficiencies and accommodate new development. The schedule must indicate project commencement and completion dates and may be relied on

²⁹ *Model Regulations and Plan Amendments for Multimodal Transportation Districts*, Center for Urban Transportation Research, University of South Florida, 2005.

³⁰ *Multimodal Transportation Districts and Areawide Quality of Service Handbook*, Florida Department of Transportation, 2004.

³¹ *Model Regulations and Plan Amendments for Multimodal Transportation Districts*, Center for Urban Transportation Research, University of South Florida, 2005.

as a basis for evaluating concurrency and issuing development permits. A plan amendment is required to eliminate, defer, or delay construction of any facility or service identified in the schedule and needed to maintain the adopted level of service standard.

As part of a long-term concurrency management system, a local government may adopt policies to establish interim level of service (LOS) standards on certain facilities for the purpose of issuing development orders or permits. The interim LOS standards noted in the inset for Capital Circle NW in Tallahassee are one example of how this might be accomplished. In this case, LOS E is established for Capital Circle NW until widening is complete. A schedule may be established that shows when incremental improvements to the LOS standards are expected. Additionally, a plan should be developed to monitor the progress of scheduled improvements. If the improvements are not made as scheduled, an amendment must be made to the comprehensive plan to establish a default LOS standard by which to issue development orders or permits.

(5) All Other Facility Locations

Significant lane miles of the SIS lay outside of concurrency alternative areas. Current review processes usually only require FDOT review of proposed developments of regional impact even though substantial impacts to the SIS may be the result of sub-DRI developments or DRI exemptions. It is imperative for FDOT, local governments, and other transportation partners to coordinate all development review to accurately assess and mitigate transportation impacts to facilities on the Strategic Intermodal System.

C. Measuring Mitigation

Although it may not be difficult to determine if mitigation is needed, it is difficult to determine if mitigation is adequate. Traditional traffic modeling may not show system relief due to the tendency of the transportation models to draw traffic to facilities with the most capacity. In addition, merely offering alternative modes to transportation system users does not result in immediate change in travel behavior and measuring that mode change is even more difficult. Jurisdictions that have chosen to promote alternative modes of transportation as mitigation for system impacts often do so based on planning objectives rather than a one-to-one trade-off of trips.

The relationship between land use measures and transportation outcomes is complex and still not well understood. Studies are sometimes contradictory and use a variety of measures and approaches, making it difficult to generalize findings to a specific strategy or feature. This is particularly true for the micro-strategies such as sidewalks, parking lot connectivity, and bicycle racks. A number of studies indicate that there are transportation system benefits to providing multimodal facilities and to

Tallahassee /Leon County Level of service Standards

The peak hour roadway level of service for Tallahassee and Leon County is established as follows:

Outside the Urban Service Area:

Interstate, Limited Access Parkways: B
Principal Arterials: C
Minor Arterials: C
Major and Minor Collectors: C
Local Streets: D

Inside the Urban Service Area:

Interstate, Limited Access Parkways: C
Principal Arterials: D**
Except Capital Circle NW from I-10 to SR 20
Capital Circle NW from I-10 to SR 20: E
Minor Arterials: D / E*.
Major and Minor Collectors: D / E*
Local Streets: D

* For Minor Arterials, and Major and Minor Collectors located inside the Urban Service Area and south of U.S. 90, the Level of Service shall be "D" for purposes of establishing priorities for programming transportation improvements, and "E" for meeting concurrency requirements, to support the Southern Strategy. Roads north of U.S. 90 shall be LOS D for both programming improvement and concurrency purposes.

** The Level of Service for Monroe Street from Gaines Street to Tennessee Street shall be "E."

Source: Tallahassee-Leon County Comprehensive Plan. Policy 1.4.1 [T], Revised Effective 7/25/03.

urban forms such as transit-oriented or traditional neighborhood development particularly in advancing alternative modes of transportation.³² This benefit is not always easy to quantify, however, as it varies considerably based on a range of variables, such as the size of the developed area, the compatibility of the land use mix, the degree of connectivity in the built environment, location of the development, socioeconomic characteristics of the affected population, and the density or intensity of uses. Highlights of some resources and publications relevant to the impact of various multimodal strategies on automobile traffic summarized are discussed in Appendix I.

Although the specific relationship between trip making and land use strategies or site design features varies by the context, some conclusions can be drawn. These are as follows:

- providing a mix of uses can increase internal capture and reinforce alternative modes, but these impacts are highly dependent on context and other factors, such as land use compatibility and network connectivity;
- connectivity of local street and bicycle/pedestrian networks does reduce local trips on arterials and increases bicycle and pedestrian travel; and
- improving pedestrian and bicycle facility level of service attracts more users.

Given such variation in existing study findings, most communities do not have specific data to support their multimodal reductions or credits. Instead, observation, and the fact that research to date indicates a trend toward multimodal benefits, becomes the basis for discretionary decisions regarding reductions in trip generation or vehicle miles traveled for various actions.

A point system based on multimodal improvements made by the developer is a method sometimes used to decrease required trip generation. The Palm Beach County, Florida Unified Development Code contains a point system used to implement planning objectives called the *Okeechobee Boulevard CRALLS Point System* ([Resource 11](#)). CRALLS is an acronym for “constrained roadway at a lower level of service.” This designation is intended for use on facilities where additional roadway travel lanes would be detrimental to the existing community fabric. The Okeechobee Boulevard CRALLS Point System was adopted as a method “to provide a means for approving new land development/redevelopment projects that will have significant traffic impacts on Okeechobee Boulevard, but will provide acceptable mitigation for those impacts.”³³ The point system seeks to accomplish the following:

- reduction of single occupant vehicle trips by encouraging ridesharing, diversion to alternative travel modes, and telecommuting;
- reduction of peak hour vehicle trips by shifting these trips to other time periods;
- reduction of land use densities and intensities for proposed development/redevelopment; and
- increase in land use densities for proposed development/redevelopment only in cases where land use mix maximizes internal trip capture and promotes feasibility of mass transit modes.

The general procedure includes application requirements, condition monitoring, and requirements for later changes to mitigation. Each strategy includes qualifying criteria, implementation timeframes, monitoring and enforcement provisions, and credit factors. Each strategy has a different calculation to determine the amount of credit applicable. See the inset (Page 61) for an example. Credit factors for each strategy used are added up to meet the minimum points needed to fulfill mitigation as determined by Table II-1.

³² *Impact Fee Credits for Livable Communities Improvements. Technical Memorandum #1, Literature Review and Alternative Approaches.* Center for Urban Transportation Research. January 2005

³³ Palm Beach County Unified Land Development Code. Article 12 - Traffic Performance Standards. 01/07 Supplement No. 3 (Effective December 1, 2006)

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The strategies include:

- mixed use development around transit corridors;
- mixed use development around transit centers;
- feeder transit service to rail stations or multi-modal transit centers; new commuter bus service; local bus/shuttle service; employee transit passes;
- parking management;
- ridesharing programs;
- telecommuting programs;
- bicycle parking facilities;
- provide access between developments;
- provide access to more than one road;
- low generation traffic sensitive uses;
- intersection modifications;
- grade separated interchange improvement;
- compressed work week/non-peak hour work hours; and
- additional mitigation fee payment.

Table II-1 Palm Beach County point system methodology

CRALLS Facilities Assigned Trips (Net 2-way peak hour trips)	Weighting Factor	Minimum Points Needed to Fulfill Mitigation (divide assigned trips by 10)
1-100	5	<=10
101-200	10	11-20
201-200	20	21-40
401-800	40	41-80
801-1000 ¹	80	81-100

Note: ¹Net 2-way peak hour trips in excess of this number shall be categorized and assigned weighting factors in a proportionate manner to the above table.

Source: Palm Beach County Unified Land Development Code. Article 12 - Traffic Performance Standards. 01/07 Supplement No. 3 (Effective December 1, 2006)

SAMPLE CRALLS POINT MITIGATION STRATEGY

Strategy 13. Compressed Work Week/Non-Peak Hour Work Hours

1. Strategy

A work site policy implementing a work schedule for full-time (i.e. working at least 35 hours per week) employees for a less than 5-day work week by extending hours of work during the remaining work days, with start and end work times that fall outside the normal AM (7 to 9 AM) and PM (4 to 6 PM) peak hours.

2. Qualifying Criteria

- a. 20 percent or more of on-site employees must be working the compressed work week schedule.
- b. Either the start or end work time or both must fall outside the normal AM and PM peak hours of on-street traffic.
- c. The work schedules for the affected on-site employees need to be documented on an annual basis.
- d. Projects must include an on-site coordinator to assist participants in the program, as well as to facilitate program performance tracking and reporting.]
- e. Project must develop a formal policy and contract between employees and managers that shall identify which job categories are eligible for the compressed work week/non-peak work hours option.
- f. Project must be an employer of 20 or more people.
- g. For those employees qualifying for credit under the non-peak hour work hours' part of Strategy 13, Compressed Work Week/Non-Peak Work Hours, no credit shall be received for Strategy 5, Ridesharing Programs.

3. Implementation Timeframe

One year from date of issuance of the first CO for the Project.

4. Monitoring and Enforcement

- a. By April 1 of each year, starting April 1 after the first full year after initiating the program, the owner, developer, or their agent, must supply a report to the County Engineer identifying the number of employees from the development participating in the program and the total number of employees employed during the reporting period, and the work schedules of each participant. This Monitoring Report shall also include a copy of the compressed work week policy and copies of each of the signed compressed work week contracts entered during the reporting period. The County Engineer shall analyze the data for compliance with the Development Order. If the program fails to meet the plan's specified criteria within one year of Project Buildout, the owner, developer, or agent shall undertake remedial action, or institute an alternate mitigation strategy.
- b. Two years following initiation of the strategy, the project's developer, owner, or agent as appropriate, may request alteration or substitution of the strategy pursuant [Art. 12.P.3.F, Time Limits](#).

5. Credit Factor

Credit factor shall be calculated in accordance with Strategy 13 Credit Factor Calculation, below:

$$\text{Credit Factor} = E \times (D + H/(5-D)) \\ 50 \times (\text{square root of } S)$$

E = number of on-site based employees that participate in program

D = number of weekdays per week that the employees do not have to drive to work due to their participation in program

H = number of peak hours per week on workdays during which participating employees will not drive to work

S = size of project in 1,000 sf

Source: Palm Beach County Unified Land Development Code. Article 12 – Traffic Performance Standards. 01/07 Supplement No. 3 (Effective December 1, 2006)

D. A Menu of Mitigation Options

An effective way for determining the appropriate mitigation of transportation is through the preparation of a series of acceptable mitigation actions. These actions could be based on a corridor management plan, a subarea plan, planning policy objectives, or some combination. This section introduces a menu of options that may be incorporated into a mobility plan. The plan must be structured carefully to demonstrate how each technique works together in a clearly demonstrated pattern to accomplish the desired mobility goal. Such plans must address land use as well as the transportation system and modes. FDOT District 4 is applying a combination of options to SR 710 (see inset).

A ROAD MAP FOR SR-710

Development pressure in Palm Beach County and Martin County has been extending westward. The existing and proposed development in the area totals more than 25,000 residential units and approximately 6,000,000 square feet of non-residential land use that, when combined, exert a great deal of pressure on the area roadway system. SR-710, a SIS facility with a rural area LOS standard, faces the brunt of the impact. The three-mile segment running from Blue Heron Boulevard to Northlake Boulevard in the vicinity of Florida's Turnpike is Palm Beach County's main concern. The County contends that even without the proposed developments, the segment will soon be deficient. Additional development approvals will accelerate deficiency on this segment (and other portions of SR-710).

In January 2007, FDOT District 4 coordinated a meeting with representatives of Palm Beach County, Martin County, DCA, FDOT Central Office, and the Treasure Coast Regional Planning Council (TCRPC), to begin laying out a long-term solution for the SR-710 corridor. A *road map* was proposed to resolve LOS issues in both counties was developed that separated SR-710 into two segments. The proposed road map included:

1. Segment One (SR-710 within the Indiantown area, Fox Brown Road to SR-76, in Martin County). Martin County should investigate whether or not this portion of SR-710 can be designated as a Transportation Concurrency Exception Area as defined by Chapter 163.3180(5) F.S.
2. Segment Two (SR-710 from SR-76 in Martin County to Haverhill Road in Palm Beach County). Each county should prepare a Temporary LOS Variance Petition and develop a Long-Term Transportation Concurrency Management System for SR-710.
3. A series of demand traffic modeling/project traffic workshops were also proposed to reach agreement on future traffic volume, the ultimate cross-section, associated funding of mitigation strategies; and timing of construction for various segments of SR-710.

The proposal envisions finalizing the traffic modeling effort for traffic projections by late 2007. This will be followed by completion of the ultimate cross-section, and then the funding agreement in the Spring of 2008. As of November 2007, both counties have officially committed to participate in the proposed road map and workshops are ongoing.

All approaches call for the use of a variety of options that work together to provide overall mobility and travel choices. The following "menu" of options may be combined in various ways and therefore be "tailored" to each individual community or sub-area.

- (1) *Transportation systems management* – Application of transportation system management techniques may improve the operation of existing highway facilities by maximizing their capacity. These techniques include improved signage, adding a median, installing turn-lanes, managing driveway spacing, encouraging carpooling as well as large-scale projects such as traffic signal systems, centralized traffic operation centers, converting intersections to freeway style interchanges, and sophisticated intelligent transportation system, or ITS strategies, like installing video cameras along the interstate.

Some areas pool developer contributions for the purpose of establishing intelligent transportation system (ITS) improvements. Intelligent transportation systems include a wide range of tools for managing traffic as well as for providing services for travelers including commercial vehicle operations, advanced public transportation systems, advanced traffic management systems, advanced traveler information systems, advanced crash avoidance systems, automatic vehicle location, machine vision, and electronic toll and traffic management systems. One of the major benefits of ITS is the maximization of the network's performance by the reallocation of travel demand or improving the reliability of transportation system through information, communication, integration and management. For example, providing traffic congestion information allows drivers to select less congested routes, diverse departure times, or a different mode of travel. Collectively, these driver choices contribute to decreasing traffic congestion.

A traffic management center or traffic operations center monitors roadway conditions through the use of closed circuit television monitoring cameras or various detectors. These centers collect information that identifies the cause of traffic congestion at specific locations. Transportation professionals can then find efficient and effective solutions to isolated instances of traffic congestion. Such solutions may include adaptive signal control which optimizes traffic signal timing plans and coordinates traffic signal control increasing the efficiency intersections and, ultimately, arterial capacity.

- (2) *Congestion management process (CMP)* can form the basis for developer mitigation – All MPOs are required by federal law to maintain a congestion management process (CMP). This process first identifies and then addresses congestion issues using travel demand reduction and operational management strategies. The CMP identifies problems that can be addressed relatively quickly using lower-cost management and operational approaches. The CMP can also be used to identify congestion problems and reduction strategies that are relatively large in scale and cost. Transportation partners may work with the MPO through the CMP to develop solutions to traffic congestion impacting SIS, FIHS, and TRIP-funded facilities.
- (3) *Transportation demand management (TDM)* – Transportation demand management may be the most underused element of an effective mobility plan. TDM consists of strategies that foster increased efficiency of the transportation system by influencing travel behavior by mode, time of day, frequency, trip length, regulation, route or cost. TDM discourages drive-alone travel through better management of existing transportation infrastructure, services and resources. TDM strategies include, for example, public transit services, carpooling and vanpooling, compressed work weeks, telecommuting, limited parking, and provision of bike and locker facilities by employers. Detailed information about TDM strategies and existing programs can be found at the National TDM and Telework Clearinghouse (<http://www.nctr.usf.edu/clearinghouse/>).

Transportation partners unfamiliar with local government land development processes will find guidance on proactive measures that can be used to influence the incorporation of TDM into the land development process in *Incorporating TDM into the Land Development Process* ([Resource 12](#))³⁴ National Center for Transit Research at CUTR, August 2005.

The report documents efforts to secure TDM strategies as part of development approvals, summarizes the long range planning groundwork that frames the land development process,

³⁴ *Incorporating TDM into the Land Development Process*, Center for Urban Transportation Research, University of South Florida, August 2005.

includes several case study examples from Florida and other states and identifies institutional barriers to the use of TDM as part of the land development process.

Transportation partners interested in using TDM in land development must get involved long before development proposals are submitted. This requires participation in review and updates of the MPO long range transportation plan and transportation improvement program as well as local government comprehensive plans. Further, it involves appraising how well the local government land development regulations implement the intent of the comprehensive plan and reviewing traffic analysis methodology and underlying assumptions. These activities will begin the integration of TDM principles and strategies into the land use and transportation planning process resulting in physical infrastructure and regulatory tools to support TDM as land development proceeds.

Table II-2, TDM strategies in land development, is an excerpt from the report. It indicates which TDM strategies may be used to influence specific travel behavior, during which land development process they must be addressed, and potential implementing partners.

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Table II-2 TDM strategies in land development

MEANS OF INFLUENCING TRAVEL BEHAVIOR	TDM STRATEGY (EXAMPLES)	SUPPORTING ACTION (LAND DEVELOPMENT PROCESS)	POTENTIAL IMPLEMENTING PARTICIPANTS
Trip length. Reduce quantity of vehicle miles.	<ul style="list-style-type: none"> Transit oriented development Proximate commuting by allowing employees to relocate job to the branch office nearest their homes 	<ul style="list-style-type: none"> Clustering related land uses and providing an inter-connected circulation system (comprehensive plans and land development regulations) Providing incentives to employers 	<ul style="list-style-type: none"> Land developer Municipal land devt regulator Economic devt organization Realtors Employer Commuter assistance program Transp management assoc
Mode. Increase efficiency of system to carry more people in the same number of vehicles.	<ul style="list-style-type: none"> Developing land in support of alternative modes, such as transit oriented development Limiting parking supply Offering alternative modes, such as transit, vanpooling, carpooling, bicycling, walking Carsharing Road pricing 	<ul style="list-style-type: none"> Locating land development to take advantage of existing underutilized transportation services such as transit routes Providing on-site amenities, such as lockers, showers, bicycle parking and preferential carpool parking (land development regulations) Providing support services such as marketing, ridematching and guaranteed ride home Providing transportation services and physical transportation facilities off-site 	<ul style="list-style-type: none"> Land developer Property manager Municipal land devt regulator Realtors Economic development organizations Transit agency State DOT Municipal public works dept Municipal parks & rec dept Employer Commuter assistance program Transp management assoc Private enterprise
Route. Bypass congestion.	<ul style="list-style-type: none"> Transit oriented development Providing route alternatives High occupancy vehicle lanes 	<ul style="list-style-type: none"> Providing a grid system, street connectivity, and destinations within easy walking distance (comprehensive plans and land development regulations) Implementing Advanced Traveler Information Systems 	<ul style="list-style-type: none"> Land developer Municipal land development regulator Realtor Economic development organization State DOT Municipal public works department Highway patrol
Regulation. Mandate specific traffic management actions or outcomes by local ordinance.	<ul style="list-style-type: none"> State growth management provisions Concurrency Trip reduction ordinances Zoning ordinances Subdivision ordinances Parking ordinances HOV lanes 	<ul style="list-style-type: none"> Carried out primarily by land developers, property managers, employers, neighborhood associations 	<ul style="list-style-type: none"> State land planning agency State DOT Municipal land development regulator Municipal public works department Municipal parking department Highway patrol
Cost. Establish incentives and disincentives.	<ul style="list-style-type: none"> Parking pricing Transit subsidies Parking cash-out High occupancy toll lanes Commuter tax benefits 	<ul style="list-style-type: none"> Tax benefit program assistance 	<ul style="list-style-type: none"> Property manager Municipal parking department State DOT Employers Commuter assistance programs Transp management assoc
Frequency. Reduce number of trips over given time period.	<ul style="list-style-type: none"> Providing on-site amenities Compressed work week Telework 	<ul style="list-style-type: none"> Providing physical facilities, such as employee cafeteria, fitness center, bank Providing technical support to employers 	<ul style="list-style-type: none"> Land developer Property manager Employer Commuter assistance program Transportation management association
Time of day/day of week. Move trips to less congested periods or avoid vehicle trip completely.	<ul style="list-style-type: none"> Compressed work week Staggered work hours Telework Flex time 	<ul style="list-style-type: none"> Unbundling parking from employment site leases Providing technical support to employers 	<ul style="list-style-type: none"> Property manager Commuter assistance program Transportation management association Employer

- (4) *Develop a new parallel reliever roadway or add capacity to an existing parallel roadway.* Parallel roads run in the same direction within reasonable proximity to one another and serve common destinations. A parallel road may be another arterial or collector road near a facility at or near capacity. Evaluation of travel demand may reveal that a parallel road may relieve the traffic congestion on the main roadway. Developing a new parallel reliever is likely to be complex and costly, particularly in terms of right of way. Designation of an existing road as a parallel reliever is a more feasible solution. This may require improving access to the reliever particularly from the main facility or connection of several existing parallel roads to create one continuous road. In addition, improvements to a designated reliever such as turn lanes, medians, signal timing, or additional lanes may be necessary to maximize traffic flow.

In some cases, parallel roads may be service roads. Service roads generally provide alternative access to commercial tracts along a major roadway. They are often referred to as frontage roads or reverse frontage roads (aka “backage” roads). Reverse frontage roads provide access behind the commercial uses facing the main road. Providing buildable sites between the service road and the major road right-of-way, creates a safer condition than frontage roads by allowing greater separation of the service road connection from the major arterial intersection. It also increases the ability to integrate corridor development with local street networks. Frontage roads parallel an arterial roadway or freeway between the roadway right-of-way and the front building setback line. Frontage roads can work well for light office or single family residential developments, where they begin and end between major road intersections. However, continuous frontage roads can lead to crashes and operational problems due to unfamiliar movements and where they connect too close to a major roadway intersection.

Opportunities to partner with the state transportation agency or MPO can increase the ability of smaller communities to create service roads on state highways. In addition, similar mechanisms may be used to relieve congestion on major roadways including corridor access management plans and street network connectivity both of which are discussed below.

- (5) *Corridor access management plans* – One technique that may be used to maximize mobility on an existing corridor is the development of a corridor management plan that addresses land use, access management, street networks, and right-of-way needs along a major roadway. A corridor management plan should include defined improvement projects and may be part of long term concurrency management system.

The corridor evaluated for the plan should extend beyond the road right-of-way into the adjacent neighborhoods. The purpose of this physical planning effort is to evaluate roadway design and access characteristics, and propose changes that maintain reasonable access to property, while improving the safety and operation of the main highway. Such changes may involve:

- medians or median opening closures;
- signal location and spacing;
- auxiliary lanes;
- right-of-way needs and requirements;
- site access and circulation design;
- land use and activity center concepts;
- improvements to the supporting roadway network;

- improvements involving access for other transportation modes (e.g. bus pullouts, transitions for special use transit lanes or bus rapid transit, pedestrian crossing treatments); and
- bicycle lanes and shared use paths.

Corridor management plans typically include a map and report establishing the desired location, spacing and design of median openings, signals and (driveway or street) connections. They should also include concepts for expanding the street network that runs parallel to and connects to the highway. Some corridor management plans are detailed maps with binding agreements that specifically indicate future property access on a parcel-by-parcel basis. Most, however, are conceptual and serve as a guide for access decisions during development review or access permitting. Improvement projects identified through this process should become eligible for funding by proposed development along the corridor.

Because the corridor management plan affects the state highway and the surrounding community, it requires both state and local government approval. Official adoption by each implementing agency is necessary to establish the corridor management plan as a legal standard that can be enforced in development review and permitting. The plans are typically implemented through a combination of regulations, interagency or public/private agreements, design standards, and road improvement projects. These tools can be supplemented with binding agreements on site access, where such agreements can be legally applied or negotiated with individual property owners.

The *Guide for Analysis of Corridor Management Policies* ([Resource 13](#)) provides detailed guidance for conducting a corridor management policy analysis including steps in evaluating local government policies and practices, methods for identifying implementation needs, and a framework for recommending policy changes, including examples and resources for further information. A review of local government policies affecting a corridor along with appropriate adjustments is key to a successful corridor management plan and should be an integral part of plan development. *SR 26 Conceptual Corridor Management Plan*,³⁵ is an example application of the techniques outlined in the guide and is summarized in Attachment II-A.

Right of way preservation is essential to corridor management plans that involve capacity and street network improvements. Right-of-way preservation is the coordinated application of measures to obtain control of or protect the right-of-way for a planned transportation facility. In Florida law, right-of-way preservation is addressed in the context of corridor management, which is defined as the “coordination of the planning of designated future transportation corridors with land use planning within and adjacent to the corridor...” (Section 163.3164(30), F.S.).

Corridor Preservation Best Practices for Local Governments ([Resource 14](#))³⁶ addresses the right-of-way preservation aspects of a corridor management plan. A variety of tools are available to preserve right-of-way and mitigate hardship on property owners, the main argument against right of way preservation. These tools include density credits, regulatory controls, options to purchase, interim use agreements, land banking, and purchase of development rights. The most effective approach is a systematic program for preserving right-

³⁵ *SR 26 Conceptual Corridor Management Plan*, Center for Urban Transportation Research, University of South Florida, 2007.

³⁶ K. Williams and R. Frey, *Corridor Preservation Best Practices for Local Governments*, Prepared for Hillsborough County, FL, Center for Urban Transportation Research, 2003.

of-way and managing access that uses the full range of governmental powers and tools to their maximum advantage.

Model access management plan amendments ([Resource 15](#)) and access management ordinance language ([Resource 16](#)) address corridor preservation. In addition, *Managing Corridor Development: A Municipal Handbook* ([Resource 17](#))³⁷ documents success stories in implementing comprehensive corridor management and identifies best practices that can be applied by FDOT, MPOs, and local governments throughout the state. The emphasis is on policy, regulatory, and funding strategies for comprehensive corridor management that can be directly applied by communities alone, or in coordination with state transportation agencies and MPOs. The study also addresses policy issues in comprehensive corridor management and recommends changes in current practice that will assist the FDOT, MPOs and local governments in managing access to the SIS and other important state highways. This document includes excellent examples of effective corridor management practices that are transferable to similar situations.

(6) *Street network connectivity* – Enhancing street network connectivity can be applied as a technique to provide highway system users alternatives to major roadway, particularly for short trips. Local and collector street networks are often underdeveloped and major highways such as SIS facilities are used as the only means of access to and from many developments. Transportation partners seeking to remedy congestion through urban areas should explore the possibility of improving adjacent street networks. Fragmented street systems increase the number and length of automobile trips and also impede emergency access. A connected road network advances the following mobility objectives:

- fewer vehicle miles traveled;
- decreased congestion;
- alternative routes for short, local trips;
- improved accessibility of developed areas;
- facilitation of walking, bicycling, and use of transit;
- reduced demand on major thoroughfares;
- more environmentally sensitive layout of streets and lots;
- interconnected neighborhoods foster a sense of community;
- safer school bus routes; and
- safer walking and bicycling routes to schools.³⁸

Although challenging, transportation partners should seek ways to connect existing fragmented systems as well as to prevent new fragments. *Accomplishing Alternative Access on Major Transportation Corridors* ([Resource 18](#))³⁹ discusses the basics of street connectivity and offers some sample code language. In addition, the planning and regulatory model for multimodal transportation districts discussed later in the report, *Model Regulations and Plan Amendments for Multimodal Transportation Districts* ([Resource 10](#)), contains land development regulation policies for improving street networks and connectivity. Another document that explores street connectivity and different approaches communities are using in

³⁷ Williams, K., and M. Marshall, *Managing Corridor Development: A Municipal Handbook*, Center for Urban Transportation Research, 1996.

³⁸ Safe Routes to School.

http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PL/FDOT_BD4545_32_rpt.pdf

³⁹ Kristine Williams and Karen Seggerman, *Accomplishing Alternative Access on Major Transportation Corridors, Proceedings of the 9th National Conference on Transportation Planning for Small and Medium-Sized Communities*, Transportation Research Board, Colorado Springs, CO Sept 2004. (Best Paper)

detail, *Planning for Street Connectivity, Getting from Here to There*,⁴⁰ is available through the American Planning Association Planning Advisory Service (www.planning.org).

- (7) *Bicycle/pedestrian network connectivity* – To foster the use of alternative transportation modes, connectivity for bicycle and pedestrian movement should be an integral part of any mobility plan. Although often considered the realm of local government alone, transportation partners should be prepared to share technical expertise in this area. Ample bicycle and pedestrian connections within and between residential areas and supporting community facilities and services, such as shopping areas, employment centers, transit stops, neighborhood parks, and schools may lessen short-range automobile trips.

A bicycle and pedestrian network comprised of a system of interconnected and direct routes can be measured by a connectivity index. Instructions on how to perform this measure are found in *Multimodal Transportation Districts and Areawide Quality of Service Handbook* ([Resource 9](#)). Missing links or gaps in the bicycle and pedestrian network should be identified and eliminated where appropriate through the development process. Missing links may include locations between cul-de-sacs, through walls or fences, mid-block where block length exceeds 660 feet, or where bicycle pedestrian routes would otherwise be “excessively” circuitous. Highest priority for improvements should be given to locations with high concentrations of pedestrian activity and where connections are needed to ensure easy access between transportation modes, with particular attention to bicycle and pedestrian access to schools, transit stops and regional greenway or trail systems. Model comprehensive plan amendment and land development regulation language can be found in *Model Regulations and Plan Amendments for Multimodal Transportation Districts* ([Resource 10](#)).

- (8) *Transit* – Many transportation partners may want to include transit in their mobility plan; however, transit is perhaps the most difficult of the multimodal solutions to implement due mainly to continuing operational costs of the system. In addition, most transit agencies focus their transit development plans (TDP) on current revenues and do not have enough resources to devote staff time to development review or system expansion. Transportation partners would benefit from including transit agency representatives in any mobility plan discussion and work with them on strategic planning for their system. A wealth of information regarding transit is available on the National Center for Transit Research website (<http://www.nctr.usf.edu/>).

The *Second Edition of the Transit Capacity and Quality of Service Manual* (TCQSM) ([Resource 19](#)), published by the Transportation Research Board in 2003, provides guidance to agencies that are establishing a new transit system, or evaluating or upgrading their current systems. The TCQSM recommends evaluating the transit systems by use of “Quality of Service” (QOS) measures using qualitative and quantitative performance measures.

Land Developer Participation in Providing for Bus Transit Facilities/Operations ([Resource 20](#))⁴¹ documents various regulatory and non-regulatory strategies that Florida’s local governments and transit agencies can use to generate public transportation funding through the involvement of private developers. Local and national case studies highlight application of these strategies. Suggestions are designed for use within the framework of local government comprehensive plans, land development codes, and transit development plans, and therefore

⁴⁰ *Planning for Street Connectivity: Getting from Here to There*, S. Handy, R. Paterson, and K. Butler. PAS Report 515, American Planning Association 2003.

⁴¹ *Land Developer Participation in Providing for Bus Transit Facilities/Operations*. National Center for Transit Research, Center for Urban Transportation Research, University of South Florida, 2002.

call for increased coordination and cooperation between local governments and transit agencies.

One transit option that is gaining momentum is bus rapid transit (BRT). According to the National Bus Rapid Transit Institute website (<http://www.nbrti.org/>), “Bus Rapid Transit is an innovative, high-capacity, lower-cost public transit solution that can achieve the performance and benefits of more expensive rail modes. This integrated system uses buses or specialized vehicles on roadways or dedicated lanes to quickly and efficiently transport passengers to their destinations, while offering the flexibility to meet a variety of local conditions. BRT system elements can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that attract more passengers and ultimately help reduce overall traffic congestion.”

When considering light rail as an option, transportation partners should seriously consider BRT as a lower-cost alternative. Extensive information regarding the application of BRT is available at the website above.

Transit-oriented development is often defined as higher-density mixed-use development within walking distance - or a half mile - of transit stations. We use a performance-based definition, and believe that projects should also:

- Increase “location efficiency” so people can walk and bike and take transit Boost transit ridership and minimize traffic
- Provide a rich mix of housing, shopping and transportation choices
- Generate revenue for the public and private sectors and provide value for both new and existing residents
- Create a sense of place

Source: Center for Transit-Oriented Development

(9) *Land use* – Land use is as important to mobility planning as the transportation system. Because local governments have control over land use decisions, this element is often left out of discussions regarding mobility plans. Transportation partners should not overlook this important element. Many studies address the transportation/land use connection. *Model Regulations and Plan Amendments for Multimodal Transportation Districts* ([Resource 10](#)) establishes that land use within a multimodal transportation district must be of sufficient size to support uses and transportation alternatives, contain a variety of land uses, including both employment and residential, and include land uses promoting pedestrian, bicycle and transit use.

One approach increasing in popularity, transit-oriented development or TOD, is typically defined as compact development within easy walking distance of transit stations (typically a half mile) that contains a mix of uses such as housing, jobs, shops, restaurants and entertainment. Such development focuses on transit- and pedestrian-friendly site design, limited parking, mixed land uses, and increased housing density.

The Center for Transit Oriented Development⁴² applies a performance-based definition to such development (see inset). Transportation partners seeking to make transit and other multimodal solutions a large part of mobility plans to mitigate impacts to SIS, FIHS, and TRIP-funded facilities should investigate the benefits of this approach as well as its drawbacks. Due to its growing popularity, there are many websites where additional information is available such as www.transitorienteddevelopment.org, the Congress for the New Urbanism (www.cnu.org), the Transportation Surface Policy Project (www.transact.org), the American Planning Association

⁴² <http://www.reconnectingamerica.org/public/tod>

(www.planning.org), and Smart Growth America (www.smartgrowthamerica.org). FDOT is preparing training for its staff regarding TODs.⁴³

(10) *Enhancing development review* – It can be challenging to incorporate multimodal analysis in the development review process. Collectively, transportation partners ask more of applicants and, as a result, get more from them regarding the status of multimodal systems and those system needs. One approach that may be used is discussed below.

- (a) *Include multimodal analyses in traffic impact analysis.* The City of Rockville, Maryland moved away from mitigation measures related primarily to providing additional roadway capacity through physical improvements and is encouraging mitigation for alternative modes (e.g., ridesharing programs, shuttles to transit stations, installation of pedestrian and bicycle facilities, etc.). Rockville applicants for developments may be obligated to contribute toward the improvement of offsite transportation and safety facilities to help address identified safety hazards for all modes. The City enacted a *Comprehensive Transportation Review Methodology* (CTR) ([Resource 21](#)) in September 2004 to evaluate the impacts of new development on the transportation system and to determine mitigation for alternative modes and assign corresponding trip credits.

E. Funding Mitigation

Transportation needs continue to grow while funding from traditional sources continues to shrink. Cooperation among transportation partners is essential to maximize use of limited transportation funds. Available state transportation funds should be leveraged with local and private funding sources. A few options for consideration include:

- (1) *Proportionate fair-share mitigation.* The 2005 amendments to Florida’s growth management legislation directed local governments to enact concurrency management ordinances by December 1, 2006 that allow for “proportionate share” contributions from developers toward concurrency requirements. The intent of the proportionate fair-share option is to provide applicants for development an opportunity to proceed under certain conditions, notwithstanding the failure of transportation concurrency, by contributing their share of the cost of improving the impacted transportation facility.

Working with Proportionate Fair Share ([Resource 22](#))⁴⁴ was developed to offer FDOT staff a detailed overview of how proportionate fair-share works and should be applied according to its intended design. The guide describes the concept of proportionate fair-share (in contrast to proportionate share; which applies specifically to DRIs), how it is calculated; its implementation at the District level for FDOT facilities; which plans, roadway types, and

⁴³ FDOT’s Public Transit Office (PTO) prepared and delivered a pilot classroom-style training to educate comprehensive plan reviewers (including DCA personnel and others) on how to recognize effective transit-oriented developments (TODs) in the context of local government comprehensive plans. PTO, along with a consultant, researched and developed the comprehensive plan TOD training course; prepared, delivered, and solicited feedback on the training and draft training material from the target audience; made appropriate modifications; and developed guidance for delivery of the training material. Discussion with course participants also assisted in determining primary criteria for codifying standards of TOD. Major themes of the training include the three Ds of TODs (density, diversity, and design), the importance of identifying TODs as special incentive districts on the FLUM, and identification of primary TOD characteristics.

⁴⁴ Working with Proportionate Fair-Share. Florida Department of Transportation, December 2006.

phases can benefit from proportionate fair-share contributions; and key proportionate fair-share agreement components.

The *Model Ordinance for Proportionate Fair-Share Mitigation of Development Impacts on Transportation Corridors* ([Resource 23](#))⁴⁵ is a model ordinance that presents a series of options that are intended as a framework for proportionate fair-share programs. The ordinance language sets forth the proportionate fair-share mitigation options in a manner consistent with and as required by Section 163.3180(16), Florida Statutes, and has been crafted to tie to existing local government concurrency management systems. Because conditions vary throughout the state, it is not the intent that a local government would adopt the ordinance verbatim as it does not address all issues that may arise within a particular context. Rather, the model ordinance is a technical assistance tool that local governments will need to adapt to their situation. The model ordinance contains some options that a local government may consider depending upon their needs. Local governments should obtain professional planning and legal assistance when adapting this model regulatory language to fit local needs.

- (2) *Alternative Funding Sources. Alternative Funding Strategies for Improving Transportation Facilities: A Review of Public Private Partnerships and Regulatory Methods* ([Resource 24](#))⁴⁶ examines public and private partnerships, such as transportation corporations, alternative financing methods, such as tax increment financing, and methods for raising revenue, such as traffic impact fee ordinances or transportation improvement districts. The report also examines regulatory methods, such as fair share mitigation and concurrency or adequate public facilities ordinances, for more systematically requiring developer contributions toward needed transportation facilities through the development review process.

Any effort to promote cost sharing for transportation improvements should strive to achieve consistency and equity of outcome – equity to prospective developers, as well as equity of contributions across the many agencies and jurisdictions responsible for maintaining transportation facilities. It should also attempt to reduce administrative burdens and provide some certainty of outcome. A potential shortcoming of fair share programs is a reliance on site traffic impact studies, which are costly to administer and may be manipulated with unpredictable outcomes. Contributions achieved primarily through negotiation tend to be the least predictable and equitable.

- (3) *Transportation Concurrency Backlog Areas.* The 2007 growth management legislation established a new option called transportation concurrency backlog areas. The legislation allows local governments to create, through an inter-local agreement, a transportation concurrency backlog area for the purpose of funding the construction and maintenance of transportation improvements to resolve backlog and deficiency issues. The governing board of the county or municipality would comprise the authority's membership. Their task would be to develop and implement a plan that eliminates all backlogs within its jurisdiction. The plan must identify all roads designated as failing to meet concurrency requirements and include a schedule for financing and construction to eliminate the backlog within 10 years of plan adoption. The plan is not subject to the twice-per-year limitation on comprehensive plan amendments.

⁴⁵ *Model Ordinance for Proportionate Fair-Share Mitigation of Development Impacts on Transportation Corridors.* Center for Urban Transportation Research, University of South Florida, 2007.

⁴⁶ *Alternative Funding Strategies for Improving Transportation Facilities: A Review of Public Private Partnerships and Regulatory Methods.* Center for Urban Transportation Research, University of South Florida, 2007.

DOCUMENTING IMPROVED MOBILITY TECHNIQUES ON SIS AND TRIP FACILITIES
PART II - TECHNICAL MEMORANDUM 2
STRATEGIES FOR MITIGATING TRANSPORTATION IMPACTS TO SIS, FIHS, AND TRIP FACILITIES

One method to fund the plan's implementation is a local concurrency backlog trust fund. Each authority may earmark and place in a trust fund tax increment funds equal to 25 percent of the difference between the ad valorem taxes collected in a given year and the ad valorem taxes which would have been collected using the same rate in effect when the authority is created. Upon adoption of the transportation concurrency backlog plan, all backlogs within the jurisdiction are deemed financially feasible for purposes of calculating transportation concurrency. The authority is dissolved upon completion of all backlogs.

DOCUMENTING IMPROVED MOBILITY TECHNIQUES ON SIS AND TRIP FACILITIES
PART II - TECHNICAL MEMORANDUM 2
STRATEGIES FOR MITIGATING TRANSPORTATION IMPACTS TO SIS, FIHS, AND TRIP FACILITIES

Attachment II-A - SR 26 Conceptual Corridor Management Plan Summary

A study of access management and street network needs along SR 26 in Alachua and Gilchrist Counties culminated in a conceptual access management plan that could form the basis for a mitigation agreement for this failing SIS corridor. Recommendations to address the observed access management issues form the basis of a conceptual corridor access management plan for SR 26. These recommendations are summarized below.

1. Plan and map parallel roadway and cross street networks along SR 26 to provide a clear framework for implementing alternative access along the corridor.
 - Each jurisdiction should add segments of the parallel roadway system to the capital improvements element of its comprehensive plan and require developer participation in implementing the system through fair share agreements as a condition of development approval for SR 26 concurrency mitigation.
 - Consider establishing a long term concurrency management system plan for accomplishing this supporting network on selected segments of SR 26.
 - Consider establishing a corridor management overlay ordinance for segments of SR 26 to aid in implementing parallel roadways and interparcel cross access in selected areas.
2. Establish a local government thoroughfare plan and adopt or update right-of-way preservation requirements to advance development of arterial and collector streets throughout the community:
 - Adopt a future traffic circulation map in the comprehensive plan that identifies the network of planned arterials and collectors to be preserved and assigns future right-of-way needs for each mapped street.
 - Enact policies and regulations that clearly restrict building in the right-of-way of a mapped transportation facility without a variance, and that clarify that ROW dedication will be roughly proportionate to development impacts.
 - Address right-of-way preservation in the development review process and provide for measures to mitigate hardship on property owners and preserve property rights, such as on-site density transfers, cluster options, and modifying alignments.
3. Enforce local street network and connectivity standards to help reduce reliance on SR 26 for short local trips:
 - Strongly enforce existing standards that require subdivisions to continue and connect to existing local and collector street networks.
 - Require developments to connect through to side streets at appropriate locations.
 - Require internal roads for residential subdivisions and consider allowing some variation in local street design to accommodate variety of cross section types, unpaved shared access drives for rural residential areas, and “skinny” streets where desired to maintain small town residential character.
4. Promote and enforce activity center development for commercial areas along SR 26 and increase the depth of commercially zoned areas where necessary to avoid commercial strip development:

- For large commercial developments require the provision and/or continuation of local and collector streets and provide street connections with surrounding residential areas so residents may access the center without traveling on SR 26;
 - Require shopping centers and mixed-use developments to provide a unified access and circulation plan and require any outparcels to obtain access from the unified access and circulation system.
 - Clarify in regulations that properties under the same ownership or those consolidated for development will be treated as one property for the purposes of access management and will not receive the maximum potential number of access points for that frontage indicated under minimum access spacing standards.
5. Strengthen and update local land division and access regulations to address access management on SR 26 and help reinforce development alternative access roads:
- Establish that existing lots unable to meet the access spacing standards for SR 26 must obtain access from platted side streets, parallel streets, service roads, joint and cross access, or the provision of easements.
 - Establish minimum access spacing standards for locally-maintained thoroughfares and use these to guide corner clearance,⁴⁷ as well. Maintain adequate corner clearance at crossroad intersections with SR 26.
6. Enact the necessary coordination measures with FDOT District 2 access permitting staff to ensure that conditions are placed in the access permit requiring properties to remove nonconforming access points and/or obtain alternative access in areas where parallel roads, service roads, and side street networks are planned. Provide FDOT access permitting staff with an opportunity to coordinate in review of proposed plats and development applications along the SR 26 corridor to prevent access problems.
7. Consider establishing a corridor management team made up of representatives of each local government and FDOT District 2 to facilitate coordination in implementing alternative access along the SR 26 corridor and to address requests for deviation from SR 26 access spacing requirements and local alternative access plans.
- In addition, FDOT District 2 should consider designating a regional access permit coordinator to participate in this process.

Assessing current land development and access management practices and developing conceptual corridor management plans are beneficial for several reasons. These activities can provide FDOT, as well as local governments, strategies for identifying and overcoming barriers to effective corridor access management in the land development process. In addition, the resulting plans can help to strengthen state and local coordination in access and development permitting. The result is a corridor management plan that, as defined in Florida planning law, promotes the “coordination of the planning of designated future transportation corridors with land-use planning within and adjacent to the corridor...” (Chapter 163.3164(30), F.S.).

⁴⁷ Corner clearance is focused on separation of access points from roadway intersections.

III. BUILD AND MAINTAIN RELATIONSHIPS

Building and maintaining relationships among government agencies and other transportation partners is essential to achieving mobility goals. These relationships are mutually beneficial to all stakeholders. Such cooperation enables participants to meet statutory requirements such as providing mobility on the SIS and providing adequate transportation facilities concurrent with the impacts of development. A genuine partnership that includes regular communication creates an environment where local governments, FDOT, and other transportation partners can work strategically to meet mobility needs.

Establishing these relationships does not happen over night, but instead requires consistent interaction. It is important to just reach out and begin. The following approaches are mechanisms for coordination and collaboration.

- (1) *Initiate and maintain contact with transportation partners.* Staff representatives of local governments, FDOT Districts, MPOs, transit agencies, and other agencies should obtain and maintain the contact information of transportation partners responsible for growth management transportation issues.

FDOT District 7 Growth Management and Access Management teams meet with Hillsborough County on a weekly basis to discuss development applications that may affect traffic conditions on the State Highway System. The FDOT DRI Coordinator also participates in these Transportation Review Committee meetings.

Include the names, position titles, addresses, telephone numbers, fax numbers, and email addresses. Information regarding changes in personnel should be shared as soon as possible.

- (2) *Collaborate on multimodal strategies.* FDOT, local government representatives, and other transportation partners should meet regularly to discuss land development issues and mitigation strategies. Such a meeting may be initiated by any of the parties. The frequency of this meeting will be dictated by development pressures, potential for impact on SIS, FIHS, and TRIP-funded facilities, and the relative complexity of the mobility issues. To guide collaboration efforts, participants may refer to the handbook *From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision-Making (Resource 25)*⁴⁸. This resource is a handbook with practical advice on establishing and maintaining collaborative relationships for multimodal decision making.

Collaboration: A purposeful process of working together to plan, to create, and to solve problems and/or manage activities.

TCRP Report 106/NCHRP Report 536

- (3) *Host (or co-host) an annual Multimodal Transportation Peer Exchange for the region.* This regional event is a forum where peer-level representatives from each District, regional planning councils, metropolitan planning organizations, local governments, transit agencies, and developers can swap ideas, share best practices, and discuss challenges. Lack of transportation funding and ever-increasing travel demand have lead local governments to realize that they cannot build their way out of congestion. Local governments and transportation agencies must work together to find multimodal solutions to transportation challenges. A peer exchange meeting offers a forum for highlighting transportation accomplishments, discussing challenges, and developing solutions. It should be emphasized to all participants that the peer exchange is not intended to compare jurisdictions efforts with one

⁴⁸ Practitioner's Handbook. *From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making*. TCRP Report 106/NCHRP Report 536, TRB, 2005.

another or to minimize any of a jurisdiction's activities. The procedure for hosting a multimodal solutions peer exchange is provided in Attachment III-A

Coordination Strategies for FDOT

Designate a point person in each district office who will serve as the growth management liaison to local governments and other transportation partners with regard to monitoring level of service per Rule 14-94 F.A.C. Furnish each transportation partner with contact information for that individual and updates as to personnel changes so that the appropriate agency representative can be contacted.

Request and review any locally adopted ordinances, plans, or concurrency management systems for potential conflicts or inconsistencies with those of the State so that local policies or requirements may be cross-referenced when appropriate.

Request notification of any and all proposed development, plats, or redevelopment applications near or adjacent to a state highway.

Engage in discussions and early, shared review of applications with the local government and developer.

Solicit feedback from the local government on relevant circumstances surrounding the proposed development.

Participate in meetings, teleconferences, or other consistent methods of coordination.

Attachment III-A - Hosting a Multimodal Solutions Peer Exchange Meeting

Purpose

A peer exchange meeting offers a forum for highlighting transportation accomplishments, discussing challenges, and developing solutions. It should be emphasized to all participants that the peer exchange is not intended to compare jurisdictions efforts with one another or to minimize any of a jurisdiction's activities.

Step 1: Preparing for a peer exchange meeting

- A. Identify co-hosts – Identify local governments or other agencies interested in co-hosting the event. The regional planning council (RPC) might be a natural fit for this role.
- B. Secure one or more professional facilitators to assist with the event.
- C. Begin planning 6-12 months prior to meeting date.
- D. Plan for a one-day event; however may be extended if organizers deem appropriate
- E. Choose an event date.
 - (1) Preferred dates may be when FDOT/local governments are in middle of their fiscal year so the results of this effort may be incorporated into the upcoming fiscal year budget.
 - (2) Avoid days when city/county commissions are meeting to maximize participation.
- F. Establish participant fee (registration fee) to cover cost of meals, etc. (Note: State funds cannot be used for providing food.) Identify an agency that can collect these fees and make necessary payments or arrange for ordering of food and individual payment on-site.
- G. Prepare list of invitees. The size of this meeting will depend largely on the size of the area being targeted. Ideally, this is a group of a 24 to 48 people that can identify areas of concern with the transportation system and work to develop multimodal solutions. Participants should include those with some decision-making power as well as those charged with implementing decisions. Suggested invitees are listed below and should include anyone who could bring efforts to a halt if not included as part of the process.
 - (1) Majority of invitees should be representatives from:
 - (a) FDOT Districts
 - (b) Local governments (i.e., planners, public works, traffic engineers)
 - (c) Regional planning councils
 - (d) Metropolitan planning organizations
 - (e) Transit agencies and operators, including paratransit
 - (f) Commuter assistance programs and transportation management associations
 - (g) Bicycle/pedestrian program representatives
 - (h) School district facility planning and transportation departments
 - (i) Industry representatives (i.e., freight, land developers, builders associations, etc.)
 - (j) Large employers or institutions (i.e., military bases, universities, etc.)
 - (2) Other invitees may include:
 - (a) Local legislators/elected officials
 - (b) School board
 - (c) AARP or local seniors representative

- (d) Council of neighborhoods representative
 - (e) Media, including local news broadcasters, periodicals, radio stations and trade publications
- H. Select and secure a meeting location based on the number of anticipated participants. The facility should be compliant with the Americans with Disabilities Act (ADA).
- (1) Possible locations include FDOT District, RPC, or MPO office (Note: If transit available, encourage participants to travel via that mode to raise awareness of multimodal concerns.)
 - (2) Room set-up: Ideally, the meeting room set-up includes round tables that enable participants to view the front of the room and have small group discussions.
 - (3) Telecommunications; the meeting location should have ability to be setup for teleconferencing.
- I. Secure speakers. A keynote speaker and speakers from each participant group having issues to share should be identified and secured for the chosen date.
- J. Prepare meeting materials (handouts, nametags, name tents, etc.). Allow adequate time for review and printing.

Step 2: Meeting day logistics

- A. Registration desk. Participants will sign in and receive meeting materials and nametag.
- B. Provide all speakers and facilitators with a detailed itinerary of the day.
- C. Include onsite continental breakfast, lunch, and morning and afternoon coffee breaks. It is important to keep attendees on-site for the day for continuity and to keep participants “on task.” The lunch may be a working lunch; however, some time for phone calls, etc. should be included.

Step 3: Meeting format

- A. The professional facilitator should establish ground rules for participation. To make this a candid problem solving and trouble shooting working session, attendees need to feel safe to express concerns and this may be difficult if the problems involve coordination issues or if there is a fear of finger pointing.
- B. Welcome (possibly Keynote Speaker), introductions, explain the meeting. Select a theme, issue, or agenda to initially focus the discussion or to get the conversation off the ground. Use an “icebreaker” technique to create a comfortable atmosphere and stress that this regional group is all “on the same team.”
- C. Clearly define the need for multimodal solutions and the expertise of all participants to develop a workable mobility plan.
- D. Transportation system status with emphasis on multimodal efforts. Participants should be encouraged to be candid about challenges and issues rather than presenting a rosy picture; avoid finger-pointing. Each participant should be prepared to share details of the agency:
 - (1) Accomplishments or “what has worked well” for the agency (of the past year or 5 years for first meeting).
 - (2) Plans for the coming year. (Include long range plan information such as future land use map (FLUM) changes, transportation or traffic circulation elements, and capital improvement elements).
 - (3) Challenges, areas of concern, or “what needs refining.” This should also identify where the agency feels need additional coordination or help from this “Peer group.” These could be tied to the specific topics of review process timing/chronology, criteria for review, staffing

- resources, data needs, lessons learned, etc. Input from participants is critical in this area because the remainder of the meeting is devoted to developing solutions for areas of concern.
- (4) Use a facilitator to capture the area of concern and prioritize for the following breakout sessions.
- E. Breakout discussions. Organize breakout discussions as appropriate.
- (1) Provide a trained facilitator and recorder for each group.
 - (a) Each group will be devoted to “brainstorming” solutions to identified areas of concern through a facilitated open dialogue.
 - (b) It is intended that solutions will be of a multimodal nature involving more than one agency.
 - (c) Ask each group to report its suggestions to the broader group.
 - (d) Narrow suggested solutions, if necessary, to an appropriate number of key solutions through an iterative combining/ranking process.
- F. Concluding activities. Development of action plans.
- (1) Reconvene breakout groups using the basic process above.
 - (a) Provide each group with an appropriate number of solutions to address.
 - (b) For each solution ask the group to identify a list of actions needed to advance that solution. Outcomes may include changes in review processes, programming of a corridor management plan, a strategic transit plan, etc.
 - (2) Join the groups and review the list of actions for each solution together
 - (a) Combine similar actions and/or rank them if necessary to establish a short list of key actions.
 - (b) Agree upon role of each agency in implementing key actions, a timeline, if appropriate, and identify how they will know if the action is being accomplished.
 - (3) Produce an action plan after the meeting and send it to each participant for a final review and additional comment period.
 - (4) Provide each agency with the following:
 - (a) The final suggested action plan. Encourage formal agency actions to advance the plan (e.g., adoption through intergovernmental agreement).
 - (b) Contact information of all participants for future exchanges.
 - (5) The action plan may be used as an evaluation tool by meeting hosts or participants prior to the next annual meeting or schedule follow-up meetings.

Step 4: Evaluation

- A. The moderator should record:
- (1) Attendance at peer exchange;
 - (2) Attendance compared to a targeted list of parties;
 - (3) Representation of meeting attendees across various coordinating agencies and municipalities;
 - (4) Active participation during meeting (presence of debate);
 - (5) Evidence of search for and expression of common ground, such as ideal outcome;
 - (6) Identified next steps;
 - (7) Distribution of meeting debriefing and a list of contacts.

- B. In addition, it would be fruitful for peer exchange participants to complete an evaluation form. The moderator should then combine and analyze these evaluations. Evaluations may address:
- (1) Skilled impartial meeting moderator;
 - (2) Appropriate mix of attendees;
 - (3) Candid discussion of issues;
 - (4) Ability of attendees of all perspectives to express disagreement;
 - (5) Disagreement results in further explanation of perspectives and problem solving;
 - (6) Evidence of search for and expression of common ground, such as ideal outcome;
 - (7) Did all attendees contribute or were some individuals or groups noticeably silent?
 - (8) Was there a consensus on the issues?
 - (9) Identified next steps;
 - (10) Identified enhanced agency roles;
 - (11) Did attendees volunteer to take on follow-up roles?
 - (12) Steps made to make coordination easier and more effective;
 - (13) Increased contact among agencies;
 - (14) What were the best results from the meeting?; and,
 - (15) What would you suggest be done differently next year?

APPENDIX I - IMPACT OF MULTIMODAL STRATEGIES ON AUTOMOBILE TRAFFIC

Highlights of some resources and publications relevant to the impact of various multimodal strategies on automobile traffic summarized below.

Connectivity and Reduced Arterial Traffic

- **Kloster, Tom, James Daisa and Rich Ledbetter. *Linking Land Use and Transportation through Street Design*. TRB Circular E-C019: Urban Street Symposium, December 2000.**

In the late 1990s, Metro, the MPO for the Portland, Oregon metropolitan area, conducted a study to analyze the effects of various street designs and classifications on transportation system performance. One task of the study was to evaluate the traffic impacts of increasing the number of local street connections in selected communities. Five geographical areas were analyzed by the project consultant to study the effects of increased or reduced connectivity. Connectivity changes were based on existing roadways and potential future connections reflecting growth concept land use assumptions.

The greatest benefit for auto traffic was observed at 10–16 local street connections per mile. Specifically, the analysis found that increasing the number of street intersections per mile to a range of between 10 and 16 street connections per mile could:

- reduce delay by 17% overall
- decrease arterial traffic by 13%
- increase the percentage of regional traffic (versus local traffic) on arterials.

These were significant findings because they emphasized that even modest improvements in connectivity can benefit local and regional travel in addition to walking, bicycling, and transit access. Based on this analysis, Metro established regional street design policies to guide the eventual design of major streets in the 24 jurisdictions that make up the Portland metropolitan area. The policies include both a design and performance option. Among other things, the design option calls for a maximum street intersection spacing of 530 feet and recommends less than 330 feet in the highest-density, mixed-use areas. No connections would be allowed within 400 ft of major intersections. Where connections are impossible, bike/ped cut-throughs are encouraged at no more than 330 feet spacing.

The performance option provides that the shortest distance from any origin over public streets to a street categorized as a collector or higher should not be more than twice the straight-line distance. For pedestrians the distance should be no more than 1.5 times the straight-line distance.

The street design policies are being implemented through the regional funding process and through local adherence to regional requirements. Specifically, the region's Urban Growth Management Functional Plan (UGMFP) requires local governments to review and modify their development codes as needed to promote multi-modal street designs that emphasize walking, biking and pedestrian travel in centers and corridors. In addition, the UGMFP limits cul-de-sac designs to promote better connectivity in local street systems. Local governments in the region now require street connections in the range of 10–16 per mile for new residential and mixed-use development in order to encourage non-auto modes of travel and shorter, more direct auto travel.

Transit Oriented Development (TOD), Traditional Neighborhood Development (TND), Mixed Use Development

- **Ewing, Reid, Eric Dumbaugh and Mike Brown. “Internalizing Travel by Mixing Land Uses: Study of Master-Planned Communities in South Florida.” *Transportation Research Record 1780, Planning and Administration, Issues in Land Use and Transportation Planning, Models, and Applications*. Transportation Research Board, National Research Council. Washington, D.C.: National Academy Press, 2001.**

In an attempt to move toward better prediction methods, 20 mixed-use communities in south Florida were studied to determine the effect of land use mix on internal capture rates. All of these communities include housing, shopping, services, and recreational facilities. Some have basic employment as well. Residential subdivisions adjacent to commercial strips were excluded. The size of the developments ranged from 325 acres (Sabel Chase) to 15,517 acres (Weston).

Travel data from a year 2000 study in the three-county region by the Florida Department of Transportation was obtained. This data was summarized in trip records by Traffic Analysis Zone (TAZ). Internal capture rates (i.e., the percent of trips that have both trip ends internal to the community) ranged from 0 to 57 percent.

Land use data was obtained for the 20 communities from the Metropolitan Planning Organizations in Miami-Dade, Broward, and Palm Beach Counties. Five land use measures were then calculated:

- size – the sum of population and employment
- density – the sum of population and employment divided by the gross land area
- entropy – the degree of land use mixing within a development
- balance – a comparison of the jobs to population ratio in the development with the jobs to population ratio for the county
- accessibility – the sum of trip attractions in a development multiplied by a friction factor related inversely to travel time between zones.

Various combinations of independent variables were tested to arrive at a best-fit model to predict internal capture. The model explained 49 percent of the variance in internal capture rates across the communities. The following expectations were confirmed:

- internal capture rates increase with size and decrease with accessibility to other regional trip attractions.
- remote communities may place greater demands on the regional road network.

Land use mix and density did not prove to be significant determinants of internal capture rates. The paper speculates on the reasons why land use mix and density did not explain the variation in internal capture rates. The reasons include sampling error from the year 2000 travel study; inaccurate land use data; the measurement of gross acres (including large water bodies in a TAZ) rather than net acres; and the use of a gross density measure over a large area.

The two largest communities (Wellington and Weston) had the highest internal capture rates. Each of them had over 30,000 residents and over 5,000 jobs. Communities of this size can be categorized as suburban activity centers, subdivisions, or planned unit developments. The Institute of Transportation Engineers (ITE) excludes these types of communities from the category of multi-use development. ITE recommends against considering this type of development when calculating internal capture rates.

- **Florida Department of Transportation District 4/Kittelson & Associates Inc. *Trip Generation for New Urbanist Developments*. Viera, FL: August 2004.**

This research, conducted by Kittelson & Associates, Inc. for FDOT District 4, documented how transit supportive design influences impacts trip generation, specifically internal capture rates. Of particular relevance to this study are the following findings from *Transit Cooperative Research Program (TCRP) Report 95*, Chapter 15: Land Use and Site Design:⁴⁹

This report considers the “3D’s” of transit oriented development – density, diversity and design, as follows: “Density is simply a measure of the concentration of opportunities within a given set of geographic boundaries. Diversity refers to various types of uses within a site and how compatible they are with one another. Design relates to how the various land uses are connected. Design is measured by items such as access and attractiveness.” The salient features of density, diversity and design as summarized by Kittelson are outlined below.

Density

Kittelson summarized the density research with the following:

“Higher residential area employment density showed an increase in pedestrian activity and a decrease in auto activity to and from a transit station. Research has shown that vehicle miles of travel (VMT) can be reduced by 10% if traditional neighborhood developments (pedestrian friendly environments) are used instead of conventional planned unit developments.

Suburban Activity Centers (SACs) are discussed in the context of past studies. In 1989, Hooper found that SACs with higher employee densities (employees per gross acre) have a lower percentage of single occupant auto trips. For example, Bellevue, WA had a drive alone percentage of 73.2% and a density of 43.2 employees per gross acre, whereas other SACs that had a density of around 28 employees per gross acre had a drive alone percentage of around 92%. This difference in Bellevue could be related to the deliberately tight parking supply and parking pricing. In a follow-up study conducted in 2000, researchers found that the existence of retail in office buildings reduced the number of vehicle trips by 6-8%. In summary, size, density, and tenancy were found to be more influential than land use mix in regards to travel behavior.”

Diversity

The balance between jobs and housing plays an important role in reducing VMT ranging from 7-30% reduction. Kittelson notes a land use mix relationship to mode choice through these findings:

“Cervero in 1989 suggested that centers with some on-site housing had 3-5% more transit, bike, and walk commute trips. He also concluded that for every 10% more commercial or retail space, transit and ridesharing increased around 3 percentage points. Parsons Brinckerhoff and Cervero in 1996 suggested that proximity is [the] most important consideration in choice of non-motorized modes.”

In discussing connectivity in relation to VMT, Kittelson summarized a comparison between traditional neighborhood developments (TNDs) and planned unit developments (PUDs) stating,

“TNDs are characterized by having compact street grids, small blocks, mostly continuous streets, efficient intersections, pedestrian- friendly sidewalks, on-street parking, high density,

⁴⁹ Kuzmyak, J. Richard, Richard H. Pratt, G. Bruce Douglas, and Frank Spielberg. *TCRP Report 95. Traveler Response to Transportation System Changes, Chapter 15—Land Use and Site Design*. Federal Transit Administration/Transit Development Corporation. Washington, D.C.: Transportation Research Board, 2003.

and a mix of land uses. PUDs are characterized by having residential cul-de-sacs, curvilinear streets, multi-lane arterials, complex intersections, high land use segregation, and lower land use densities. Kulash in 1990 suggested that TND networks produced less VMT than PUD networks by the following percentages: 57% less internal trip VMT overall, 40% less on local streets, 15% less on collector streets, and 25% less on arterial streets.”

Design

The 3rd “D” in transit oriented development is design that “measures by items such as access and attractiveness.” The livable communities initiative addresses some types of “links” between land uses.

“JHK Associates and K.T. Analytics found in 1993 that improved pedestrian access could reduce vehicle trips by 1-3% [*Note: TCRP 95 also noted that provision of bike lanes and storage reduced vehicle trips by a fraction of a percent; provision of a shuttle to nearby rail stations supported by urban design reduced vehicle trips 4 to 6%*]. Parsons Brinkerhoff concluded in 1993 that VMT could be reduced by 10% by changing pedestrian environmental factors from average to very pedestrian friendly. In 2001, Ewing and Cervero found that sidewalk completeness, route directness, and network density have vehicle trip elasticity of –0.05 and VMT elasticity of –0.03. [*Note: Elasticity is a measure of the responsiveness of one variable to another. These measures indicate that slight changes in trips and vehicle miles traveled can be accomplished through improvements in the stated variables.*] In 1994, Cambridge Systematics attempted to quantify transit usage as a function of different design characteristics. This was accomplished by identifying six major design characteristics and looking at the percentage point differences between transit use with and without the design characteristic. Increases in transit usage were found as follows:

- substantial land use = 3.5%
- accessibility to services = 3.3%
- availability of convenience services = 3.7%
- perception of safety = 1.8%
- aesthetic setting = 4.1%.”

Therefore, this research suggests that proper land use mixing along with incorporating aesthetic qualities into the design can increase the number of transit trips. The Kittelson research concluded, “...there is no conclusive body of knowledge that provides quantitative guidance as to the amount of internal capture that can be expected relative to the density of development, diversity of development, or design (connectivity) of development.” Kittelson further concluded that a number of factors contribute to greater internal capture rates including land developed densely enough to “to make the trip among land uses convenient for walking or bicycle activity,” diverse land uses, and appropriate internal site design. “Internal site design is a key ingredient for promoting internal trips. Pedestrian connectivity among land uses should include direct (short) paths, shaded external (or air-conditioned internal) connections, and a pleasant walking environment with directional signing.”

- **Kuzmyak, J. Richard, Richard H. Pratt, G. Bruce Douglas, and Frank Spielberg. *TCRP Report 95. Traveler Response to Transportation System Changes, Chapter 15—Land Use and Site Design. Federal Transit Administration/Transit Development Corporation. Washington, D.C.: Transportation Research Board, 2003.***

The Kittelson report, Trip Generation for New Urbanist Developments (above), contained many findings from TCRP 95. In addition, the report found, “Non-motorized travel (NMT) choice, primarily walking and biking, reaches 7 percent of daily trips nationwide at population densities of

2,000 to 5,000 persons per square mile, climbing to 46 percent at over 50,000 persons.” In 2000, the Pinellas County population density was 3,291 persons per square mile.⁵⁰

Transportation Demand Management (TDM)

- **Winters, Philip L. and Francis Cleland. Worksite Trip Reduction Model and Manual. Tampa: National Center for Transit Research/Florida Department of Transportation, BC137, April 2004.**

In an effort to assess the trip reduction achievable through transportation demand management programs and transit services, the National Center for Transit Research at the Center for Urban Transportation Research designed a Worksite Trip Reduction Model and Manual to predict “the extent that each incentive, disincentive, or program would impact traffic volumes and parking needs in a specific worksite.” The Worksite Trip Reduction Model and Manual use a neural network approach and were developed using existing data on programs, services, and incentives contained in thousands of before and after worksite trip reduction plans in Los Angeles, Tucson, and Washington State.

This study demonstrates how changes to a wide range of transportation-related variables can affect vehicle trip rate (VTR). Approximately 60 different variables were examined and assigned to the following categories:

- facilities and amenities
- guaranteed ride home programs
- flexible timing
- marketing programs
- ride share matching programs
- financial incentives
- parking management
- telecommute programs
- compressed work week programs
- onsite incentives
- non-financial incentives
- commuter tax benefit incentives

Impact of Employer-Based Programs on Transit System Ridership and Transportation System Performance ([Resource 26](#))⁵¹ documents the effectiveness of employer-based transportation demand management (TDM) programs on local, corridor, and regional transportation systems. These efforts were developed to be understood by traffic operations professionals, while illustrating the impacts of TDM programs to policy and transportation decision makers.

The report’s findings are based on a database of employers in and survey responses for the Commute Trip Reduction program implemented by Washington State Department of Transportation (WSDOT). Analysis was conducted on data taken during the extended AM and PM peak periods of commute trip reduction-participating employers located along an 8.6-mile corridor. The report revealed promising results based on a CORSIM evaluation of pre- and post-program influences on traffic congestion within the corridor. The results showed significant reductions across numerous performance measures, including vehicle-minutes, lane-miles of spatial congestion, travel time, travel speed, and various environmental measures. A web-based program was also developed to give guidance to other transportation professionals on the methodologies created from this study.

⁵⁰ Pinellas County Metropolitan Planning Organization. *2025 Long Range Transportation Plan Update*, 2004.

⁵¹ *Impact of Employer-Based Programs on Transit System Ridership and Transportation System Performance*. Center for Urban Transportation Research, University of South Florida, 2007.